

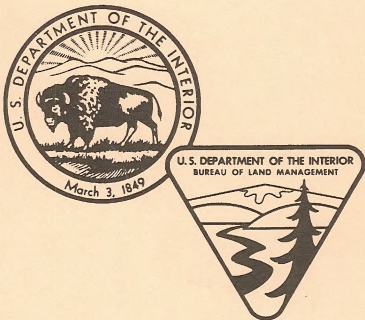


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# TIMBER PRODUCTION COSTS

## SCHEDULE 20



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
OREGON STATE OFFICE  
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(June 1969)UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

## MANUAL TRANSMITTAL SHEET

Release  
9-121Date  
June 20, 1977Subject 9353.3 - TIMBER PRODUCTION COSTS  
(Schedule 20)

1. Explanation of Material Transmitted: BLM Timber Appraisal Production Cost Schedule (Schedule 20) for Oregon and Washington.
2. Reports Required: None.
3. Material Superseded: Previous Logging Cost Schedule 19 issued 5/1/74 is cancelled.
4. Filing Instructions:

REMOVE:9333.3 - Schedule 19  
307 sheets including  
Table of Contents and  
AppendicesINSERT:9353.3 - Schedule 20  
229 Sheets including  
Table of Contents and  
Appendices

State Director

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.01 Purpose. This supplement contains cost data and guidelines used in estimating production costs for timber appraisals. Information in this release is intended for internal use by the Bureau of Land Management in Oregon and Washington. Its applicability for use by others or for other than appraising BLM timber tracts in Oregon and Washington is not implied. Further, any valid comparisons with empiric or "average" costs must give full consideration to the data sources and assumptions used in this supplement.

.02 Objectives. The schedule is designed to provide a systematic approach for field appraisers to model production costs of the "Average Operator". It presents necessary data to accurately estimate all costs incurred in the conversion process from the standing tree to the Utilization Center. Cost tables and backup data detail provides the appraiser an opportunity to use cost tables directly, when appropriate, or to make adjustments to compensate for special or unusual conditions. Field appraisers must have familiarity with the schedule's composition and its development in order to adequately estimate costs as used in the BLM appraisal concept and reflected in this supplement.

.03 (Reserved)

.04 Responsibilities. Primary responsibilities relating to the development and updating of this facet of the appraisal system include:

A. The State Director is responsible for administration of the appraisal system including:

1. Identification of cost areas needing revisions, modification and updating.
2. Assignment and scheduling of cost data collections, analysis and computations.
3. Assembling, publishing and implementation of cost schedules.
4. Developing methodology for obtaining and analyzing cost data and time studies.
5. Producing cost tables by automatic data processing from operating rates and time study data.
6. Reviewing cost data and schedule revisions for technical adequacy.

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B. The District Manager is responsible for preparing accurate appraisals including:

1. Making continuing review of cost schedules and recommending revisions and modifications as needed.
2. Collecting, analyzing and compiling local cost data as assigned.
3. Development of procedures, including backup cost data and cost tables for local conditions to meet appraisal situations unique to an individual district.
4. Testing existing and revised cost schedules for appropriateness to local conditions.

.05 (Reserved)

.06 Policy. Cost data used in this schedule is current to the extent possible. The cost tables contain current wage and equipment costs but are not applied to recent time study data. The costs in this schedule do not include any profit or risk to the purchaser or his contractors except for materials or services purchased on the local market. Profit and risk allowances in BLM appraisals are based on product selling value and are computed as a separate component of the appraisal formula. Primary cost items i.e., wage and machine rates for logging reviewed annually. Plywood manufacturing costs are changed annually based on industry cost. Cost tables and related information in this supplement are used to appraise all BLM timber offered for competitive sales; unless, the appraiser finds evidence such costs are not representative of conditions for the individual tract. Adjustments to reflect representative conditions or to cover special or unusual situations are documented in the appraisal file. Limits and bases for making such adjustments are determined by the District Manager and his district cruiser/appraiser staff..

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.07 Background. This the twentieth BLM logging cost schedule for Oregon-Washington; thus it is designated "Schedule 20". It is a composite of wage and machine costs obtained from industry and equipment company sources and applied to time studies of various ages conducted by BLM in Oregon. It is issued as an Oregon State Office Supplement as it pertains entirely to logging costs (tree to pond) for Oregon and Washington. The release is made up of three components:

1. Descriptive and procedural text.
2. Cost tables - listed as illustrations.
3. Basic cost and time study data - recorded in the appendices.

The basic cost and time study data (appendices) are used in the development of the cost tables (Illustrations). Illustrations and appendices will be revised as cost data is updated and changed. District office manual supplements may be issued as needed to reflect generalized local conditions and record costs common to an individual district.





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.3 Production Costs.

.31 Cost Allowance Principles. Each tract of timber has its own characteristics. A timber appraisal must reflect the consideration of these characteristics such as quality and quantity of the timber, features of topography, and tract location relative to road and manufacturing facilities. The schedule furnishes a systematic means to estimate local and specific costs relative to characteristics of each specific tract.

A. Tree to Pond Costs cover falling and bucking, rigging, yarding and loading, transportation and other contractual costs associated with harvesting the specific tract of timber. Costs concerned with those activities are estimated from this schedule on the basis of field information and factors collected by the appraiser.

1. Procedure. Cost tables for the various activities are compiled from operational rates (computed from wage and machine costs obtained from industry and equipment company sources) as applied to BLM time studies. Time studies for the timber harvesting functions were conducted several years ago. The studies furnished times required to perform a specific job, including normal delay and lost time on the job. The times relate to certain measurable variables affecting rate of production. There are scores of combinations of variables which affect the individual timber harvest function. Many are difficult or impossible to measure. Thus, only measurable variables, considered important which could be isolated and measured are used. Others are accounted for through their inter-relationship with those evaluated and as used in averages for the samples taken.

a. Cost Tables. Cost tables in Illustrations 1 through 6 were prepared through use of production rates determined largely by BLM time studies as noted before. In a few cases where extrapolation of original data produced unrealistically low results, minimum costs were established. Some data were supplied by the Pacific Northwest Forest and Range Experiment Station and BLM records of actual costs. Information used to compute machine ownership rates were furnished by Equipment Sales Personnel and operators using the particular piece of equipment. Machine operating costs were calculated from purchase prices and operating expenses furnished by local timber industry sources as well as by manufacturers and distributors of equipment and supplies. Machine rental rates were obtained from published schedules of the Oregon State Highway Division. Basic wage rate data and adjustment factors were obtained from the Timber Operators Council Inc. 6825 S.W. Sandburg Street, Tigard, Oregon 97223 and other varied reliable sources and cover union and non-union wage rates.

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b. Field Data Accuracy. The necessity for accuracy and reasonableness in obtaining field data by the appraiser is paramount. Laxity in obtaining such data or indiscriminate use of the cost schedule can result in inaccurate answers which are impossible, or at the best, difficult to detect. Cost estimates resulting from the use of this schedule are no better than the field data collected for use in the appraisal.

2. Scope. The cost tables are representative of the normal range of logging and road construction conditions. If the appraiser encounters unusual conditions, he should use the basic data in the appropriate appendices. The basic unit of volume for which costs are expressed is one thousand board feet as described by the Scribner log rule based on taper measurements made at 16' intervals on the stem of the tree.

.32 Falling and Bucking.

A. Merchantable Tree.

1. Western Oregon - Cost table, Illustration 1. Table 1 for falling and bucking in western Oregon is based on time studies made under varying conditions of brush, weather, slope, etc. These costs reflect cutting in the normal woods run log length. Payment to the men falling and bucking the timber where the time studies were conducted was both by the hour and by the thousand board feet. Consequently, average payments have been reduced to an hourly wage basis for application. The following nine variables were analyzed to determine the effect of each on the falling and bucking time:

D.B.H.	Gross volume
Number of 16' logs	Slope in percent
Number of 16' logs squared	Percentage of top loss
Number of 16' logs cubed	Percentage of bottom and top loss.
Merchantable sized stems per acre (includes culls & snags).	

However, only number of 16' logs, number of 16' logs squared, percentage of top loss, and stems of merchantable size per acre proved to be significant. A very strong relationship existed between those variables and the time required for falling and bucking a thousand board feet of gross tree volume. Apparently the D.B.H. was not significant in this analysis because of the close correlation between it and other variables. Thus, the cost table is worked out to show the relationship between cost per MBF gross volume and tree height, percent top loss, and stems per acre. Studies in windfall log making indicate that costs are quite comparable to log making in standing timber. Therefore, normal falling and bucking costs should be used for log making in windfall.

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2. Eastern Oregon - Cost table, Illustration 1. Table 2 is not based on time studies but rather on the cost per thousand board feet paid to fallers by industry in that area. This is in keeping with the BLM method of harvesting pine and associated species whereby the size of the trees, which are generally mature and overmature, do not vary greatly on the average as well as with the method of payment for this function.

3. Directional Felling - No detailed time studies have been conducted on directional felling; because this is a common practice in western Oregon, and a frequent timber sale contract requirement the following cost guidelines are given in Illustration 1.

B. Non-merchantable Trees and Snags.

1. Western Oregon - Illustration 1, Table 3, may be used with individual tree d.b.h. or with an average d.b.h. where necessary. Measurements from which this table was made were taken on the perimeter of the tree, with or without bark. Therefore, to use the table, measurements should be made in the same manner. Where it is necessary to fall trees with a smaller diameter than is listed in the table--hardwoods, for example--use the cost of falling unmerchantable snags for the smallest diameter listed.

2. Eastern Oregon - Illustration 1, Table 4 was developed by computing a differential wage rate for eastern Oregon felling, and applying this adjusted wage to western Oregon time study data. To use this table, field measurements would be made in the manner described.

C. Commercial Thinnings (Western Oregon). Illustration 1, Table 5, costs were developed for Bureau of Land Management use from U. S. Forest Service Research Paper PNW-41 (1967), Production Rates in Commercial Thinning of Young Growth Douglas-fir, by Thomas C. Adams of the Pacific Northwest Forest and Range Experiment Station.

1. Merchantable Tree Falling and Bucking Costs, (i.e., Commercial Thinnings (Western Oregon), Illustration 1, Table 5. The tabular cost for falling and bucking a one-log tree is the same as that for a two-log tree in the same d.b.h. class; the cost for falling and bucking a three-log tree is the same as that for a four-log tree, etc. The reason for this coincidence is that the costs are really based upon number of bucking cuts rather than on the number of 16' logs, with a 32' log as standard. Thus, both one and two 16' logs represent one bucking cut; both three and four 16' logs represent two bucking cuts, etc.

2. Non-Merchantable Tree and Snag Felling. For costs of non-merchantable tree and snag felling, use Illustration 1, Table 3, "Non-Merchantable Tree and Snag Felling - Western Oregon"



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.33 Rigging, Yarding and Loading.

A. Move-in. This includes the cost of moving logging equipment into the timber sale contract area. In this schedule, it is considered separately from rigging cost. This enables the appraiser to select from Illustration 2, Tables 1 and 2, move-in cost for any machine or combination of machines which he judges optimum for a particular situation. Thus, the appraiser may tailor his cost allowance to the local situation. The listed allowances cover all the costs of moving equipment to the job including the wages of attendant personnel. The following example is given as a guide to the use of these tables:

Move-in costs - usual high-lead side, western Oregon

<u>Item</u>	<u>Cost</u>
90 Ft. Tower	\$ 305.00
Mobile Loader-Rubber Tired	\$ 390.00
D7 or equivalent	\$ 320.00
Total high-lead move-in cost	\$ 1015.00

B. Rigging. These cost tables do not include the cost of moving equipment to the job, but are limited to costs involved in setting up yarding and loading equipment, and landing construction. There are many situations which warrant other than normal rigging costs. Determination of the correct allowance is left to the discretion of the appraiser. Rigging cost tables are listed on Illustration 2, Tables 18, 25, 29, 35, 40, 43, 45, and 49.

1. Mobile Yard-Loader rigging costs are limited to those involved in moving the machine from setup to setup, stabilizing it with guylines or outriggers, placement of tail and side blocks, rigging lines, and landing construction (if any). The mobile yard-loader usually operates from the shoulder of a road, building small decks of logs and moving frequently from setting to setting, so that landing construction is normally a minor cost.

C. Yarding.

1. Yarding cost is the cost of moving logs from the bucked tree on the ground to the landing for loading or swinging. All yarding costs are based on the gross volume of material yarded to a landing. This volume will obviously include some defect in most cases. While the tables list cost by the volume of a 16' log, the studies included the normal range of log lengths actually yarded and were converted for use with cruise data.



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2. Yarding distance is the distance from choker setting point to landing over which the logs must actually travel. These distances refer to the distance for any turn or average of turns and not to the external distance for an area.

D. Loading. Loading cost is the cost involved in loading logs on a truck at a landing under normal conditions. The cost is based on a separate loader, i.e., both a yarder and loader, except for mobile yarder-loader which does both jobs. For loading production which is limited to the yarding production (hot deck loading) the volume loaded is assumed to be essentially the same as that yarded--that is, having the same volume of defect. If this is not the case, an adjustment must be made. Cold deck loading also includes whatever percentage of defect will be hauled to the plant and is presumably approximately the same as that yarded.

E. Tractor.

1. Western Oregon - Yarding. Illustration 2, Tables 3 and 4 are the result of time studies taken on six Bureau of Land Management timber sales. Times were taken on the yarding, choker setting, delays, and other related activities for some 511 turns on a wide range of conditions in Western Oregon. Other data taken in the field were percent slope, haul-in distance, straight-line distance, volume per log, volume per turn, number of logs per turn, and number of stems per acre. All of the foregoing items were analyzed to determine the significance of their effect on the time per MBF to tractor log. The machine rate used is current for a tractor having equivalent h.p. to those used on time study areas. It is extremely important to note that the distance referred to in this table is the distance the tractor actually move in yarding the logs. A factor must be applied to the average horizontal yarding distance as scaled from the map layout, to compensate for weave and slope. In the absence of data pertinent to a particular situation, it is suggested that this map distance be increased by 20 percent (factor 1.2). Tractor yarding and loading costs are combined in Table 3. It is not necessary to interpolate Tables 3 or 4.

2. Western Oregon - Loading. Illustration 2, Table 5, covers hot deck loading on a landing to which logs are yarded by tractor. The production varies directly with the production of the yarding operation to the point at which volume yarded exceeds loading capacity and cold decking becomes necessary. From that point on the cost remains uniformly equal to that of cold deck loading. It is not necessary to interpolate Tables 3 or 5.

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3. Western Oregon - Partial Cut Operations. Illustration 2, Tables 6, 7 and 8 for partial cut tractor operations in western Oregon were developed from 28 time studies made on 16 operations in the Medford District. Yarding time and other pertinent data were recorded for 799 turns of logs over a wide variety of conditions in topography and marking practices.

Tables 7 and 8 provide adjustment factors for small "Salvage pickup" type operations when the full equipment and crew complement for partial cut tractor yarding are not usually used. Those adjustments reflect a front end log loader, one yarding tractor and a correspondingly smaller crew.

4. Eastern Oregon - Yarding. Illustration 2, Tables 19 and 20 costs are based on time studies conducted under typical east side logging conditions, i.e., slopes varying but not generally severe, and rather normal, fairly open stands. The machine rate used is current for a tractor having equivalent h.p. with those used on time study areas. The distances are, as in the case of western Oregon tractor yarding, those which the tractor actually travels. Under the normal Bureau of Land Management average yarding distance determination procedures, an addition must be made to compensate for additional tractor traveling distance in order to use this table. An increase of 20 percent is suggested to compensate for weave and slope.

5. Eastern Oregon - Loading. Illustration 2, Table 21 - Loading for a tractor yarding operation is hot deck loading on a landing to which logs are being yarded by tractor. The production again varies directly with the production of the yarding operation to the limit of loading capacity. From that point on, the cost remains uniformly equal to that of cold deck loading.

F. Low Ground Pressure Yarding System.

1. Western Oregon - Yarding. Illustration 2, Tables 9 and 10 current machine rate (FMC 210) and wage rates were applied to the tractor yarding time study data for western Oregon. The lower ground pressure of this machine should result in longer operating seasons and more acceptable use on certain soil types.

2. Western Oregon - Loading. Illustration 2, Table 11 covers hot deck loading on a landing to which logs are yarded by a low ground pressure system.

3. Western Oregon - Partial Cut Operations. Illustration 2, Tables 12, 13, 14, 15, 16 and 17 for partial cut low ground pressure yarding system were developed by applying current machine rate (FMC 210) and wage rates to time study data from partial cut tractor operations. Tables 13, 15 and 17 provide adjustment factors for small "salvage pickup" type operations.

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4. Eastern Oregon - Yarding. Illustration 2, Tables 22 and 23 are based on east side tractor yarding studies with current FMC 210 machine and wage rates. If average yarding distances are computed in the usual manner (Straight line, horizontal distance) an addition of 20% is recommended to compensate for weave and slope.

5. Eastern Oregon - Loading. Illustration 2, Table 24- Loading for FMC yarding operations is hot deck loading. The production varies directly with the yarding production.

G. High Lead.

1. Western Oregon - Yarding. Illustration 2, Tables 26 and 27 are based on two sets of time studies on twelve Bureau of Land Management timber sales. The first set involved times for some 1183 turns. The second set included times for 801 turns. Care was taken to insure that a wide variety of logging conditions was included. Other data recorded in the field were ground slope, line slope, yarding distance, number of logs per turn, gross volume per turn, volume per acre, and stems per acre. Each set of studies was then analyzed separately but in an identical manner. The time per MBF for each turn was determined. Then the field data, such as yarding distance, volume per log, stems per acre, etc., were tested to determine the significance of their effect upon the time per MBF. In both sets of studies, the same group of factors were statistically significant--volume per log, percent line slope, and yarding distance. Through a covariance analysis it was determined that the two sets of studies could not be lumped together and considered as one. As a result, a common equation was computed. The yarding time per MBF table was then constructed from the common equation. Supplemental delay times were added and the machine and wage rates applied. The tables are constructed so that no interpolation is necessary.



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2. Western Oregon - Portable Tower Yarding. Illustration 2, Tables 26, 27, 30, 31, 32, 33, 38 and 39 were developed by applying portable tower machine rates plus applicable crew wage rates to the regular high-lead production study per MBF. The capabilities and general characteristics of these systems are as follows:

a. 90 foot Berger M.E. capable of yarding any area where a portable tower can be successfully employed. This machine has a carriage capability for a "shot gun" gravity feed system. Maximum reach (as computed) is 1000 to 1200 feet slope distance.

b. 110' Tower, Skagit BU 98 Yarder. Capable of yarding the largest old growth timber. Creates less soil disturbance to upper slopes due to greater lift. Cost for this machine is based on high lead operation but it is suitable for "shot gun" carriage use. Line capacity: Mainline 1680' of 1 1/4" or 2000' of 1 1/8"; haulback: 3900' of 1" or 5200' of 7/8".

c. Washington 78 FL Skylock Yarder Swing Boom Track Yarder. Rigged for High lead yarding. Adaptable for use with running skyline. Suitable for all timber except the largest old growth and with a maximum yarding distance of 1000 feet.

RUNNING SKYLINE CABLE RECOMMENDATIONS

DRUMS	HAULBACK	MAIN	FRONT	STRAW	GUTLINE
MAX. RECOMMENDED CABLE LENGTH AND DIAMETER	2,250'-3/4" 3,250'-5/8"	1,200'-5/8" 1,800'-1/2"	1,200'-5/8" 1,800'-1/2"	5400'-5/16" 3680'-3/8"	270'-3/4"
MAX. RECOMMENDED YARDING DISTANCE	5/8" MAINLINES, 3/4" HAULBACK - 1,100' 1/2" MAINLINES, 5/8" HAULBACK - 1,600'				

HIGHLEAD CABLE RECOMMENDATIONS

DRUMS	HAULBACK	MAIN
MAX. RECOMMENDED CABLE LENGTH AND DIAMETER	3,250'-5/8"	1,050'-3/4"
MAX. RECOMMENDED YARDING DISTANCES	3/4" MAINLINE, 5/8" HAULBACK	

LINE SPEEDS AND PULLS

DRUMS	HAULBACK	MAIN	FRONT	STRAW	GUTLINE
MAX. LINE PULLS (LBS)					
FULL	14,700	48,700	24,800	5,600	3,060
EMPTY	17,000	52,600	26,600	13,400	4,000
MAX. LINE SPEEDS (FPM)					
FULL	1,502	1,350	1,350	4,050	164
EMPTY	1,309	1,250	1,250	1,680	125



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3. Western Oregon - High Lead Loading. Costs recorded in Illustration 2, Table 28, for loading is hot deck loading on a high-lead landing. The production varies directly with that of the yarder to the point at which volume yarded exceeds loading capacity and cold decking becomes necessary. From this point the cost is uniformly equal to that of cold deck loading. It is not necessary to interpolate the table.

H. Skyline. Skyline systems may offer substantial advantages over conventional logging systems by reducing excessive road construction costs and providing better site protection including minimizing soil losses.

Skyline logging usually requires different access road locations than logging with conventional equipment. Therefore, planning for skyline layouts must be coordinated with road development planning.

1. Western Oregon - Static Skyline Yarding. Illustration 2, Tables 36 and 37, pertains to operation of large skyline equipment with uphill or downhill yarding capability of 5,000 feet or more slope distance. The cost tables are based on a time study conducted on Bureau of Land Management clear cut timber sale layouts over a period of four months. Data recorded in the field included skyline slope yarding (in-haul) distance (measured along average ground slope), lateral skidding distance and lateral slope (both measured at right angles to skyline axis), number of logs per turn, gross volume per turn, and time for each phase of the yarding cycle (haulback, lateral outhaul, hooking, lateral skidding, in-haul and unhooking). These data were grouped in two categories: uphill yarding (248 turns) and downhill yarding (210 turns). Initial analysis indicated that total time per MBF yarded, rather than time for each phase of the cycle, was meaningful. Each type of yarding was then analyzed separately but in an identical manner. The field data were tested to determine the effect of each independent variable on time per MBF. In both uphill and downhill yarding, the most statistically significant variable, by far, was volume per log, as calculated from number of logs per turn and gross volume per turn. Yarding distance was significant at a much lower level.

A covariance analysis showed that the data for the two types of yarding could not be combined to serve as a single datum base. Therefore, a common equation was developed to fit both types of data. This equation includes a delay time factor. The table of yarding times per MBF was then constructed from this equation. Machine and wage rates were applied to the yarding times. The resulting cost tables need no interpolating.

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2. Western Oregon - Skyline Loading. All skyline loading is hot deck loading on a skyline landing. As in high-lead loading, production varies directly with that of the yarder. No separate skyline loading cost table is included herein, i.e., a cost table for hot deck loading. If skyline hot deck loading costs must be separately identified, they can be calculated by deducting yarding costs from the corresponding combined yarding and loading costs. If cold deck loading cost is needed, use Illustration 2, Table 42.

I. Commercial Thinnings.

1. Western Oregon - Yarding. Illustration 2, Tables 46 and 47, are based upon a series of field studies conducted by the Pacific Northwest Forest and Range Experiment Station on commercial thinning operations in western Oregon and western Washington. Study areas were characterized by moderately even-age stand conditions and slopes generally under 40 percent. Time study data included observations of 236 turns of logs for the light crawler tractor and 296 turns for the rubber-tired skidder. Data were recorded for a wide range of variables, all of which were analyzed for significance by step-wise multiple regression. Significant variables were retained in the formulae developed to compute yarding cycle time for each of the two tractors. It is not necessary to interpolate Tables 34 and 35. The appraiser is given a choice of two machines because silvicultural objective and/or physical factors may favor the use of one or the other. When the average log is small, as it normally is in a thinning sale, the rubber-tired skidder is substantially more economical, on a cost per M basis, than is the light crawler tractor. However, difficult terrain and a considerable number of large logs may require the greater tractive power of the crawler. Preference of local loggers for one machine or the other may also influence the appraiser's choice.

2. Western Oregon - Loading. Illustration 2, Table 48, Loading Cost, as defined for commercial thinnings, is the cost of loading logs on a truck from a cold deck at a landing. The cost is based on the operation as performed by a logging contractor using a light rubber-tired loader. This loading operation includes whatever percentage of defect will be hauled to the plant, which is presumed to be approximately the same as that yarded.

J. Small Operations.

1. Type Operations. This section is intended to give cost guides where sales of small volumes of timber are contemplated. For example, right-of way timber or salvage of a few high risk trees or merchantable snags.

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2. Small Mobile Loader With Yarding Tractor. Illustration 2, Tables 3, 4, 6 and 7 lists tractor yarding costs applicable for small operations. Illustration 2, Table 43 lists loading and rigging costs for a small sized mobile loader. This is cold deck loading and the loading operation should involve little or no delay time. Loading cost per MBF is relatively constant.

3. Light Yarder Loader Operations. Illustration 2, Table 44 is appropriate for small operations when very light partial cut logging is being considered and silvicultural or physical conditions favor cable logging over tractor logging. These cost tables should not be used for the "typical" yarder loader harvest or normal salvage type operations.

K. Other Allowances.

1. Swinging.

a. Hot Deck Swinging - Western Oregon. Illustration 2, Table 39 costs reflect hot deck swinging conducted simultaneously with yarding, i.e., the logs yarded to the "hot deck" are "swung" to the roadside landing as fast as they are yarded. The swinging production rate is thus limited by the capacity of the yarder. Since the producing capacity of the yarder is the limiting factor, high-lead hot deck swinging costs are based upon yarder production as indicated by BLM time studies. Cost of operating a swing tree has been applied to the time dictated by the conditions which determine yarding production.

b. Cold Deck Swinging - Western Oregon. Illustration 2, Table 41 reflects cold deck swinging which takes place after all the logs have been harked and decked. It involves the movement of logs from "cold deck" to a roadside landing. Factors which limit cold deck swinging production include yarder line speed, log size, and distance from deck to landing.

Costs are based on time studies made on North Bend Skyline operations. Adjustments have been made for current costs. Since yarding production has no influence, yarding distance is excluded as a cost factor. Log size and distance from deck to roadside landing are the variables used to determine cost.

2. Cold Deck Loading - Western and Eastern Oregon. Illustration 2, Table 42 refers to the loading of trucks from a landing on which the loading production is not limited to the production of the yarding operation, as it is under hot deck loading conditions. Cost applies to both eastern and western Oregon operations. It is based on the operating cost of a mobile loader operation, loading 165 M bd. ft. per eight hours.



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3. Gross Yarding (cull material). Contract requirements frequently require that the timber purchaser remove cull material from a stream channel to allow passage of anadromous fish or to improve drainage. "Gross" yarding may also be desirable as preparation of the cutting area for establishment of the next crop of trees.

Appraisal allowances for such contractual requirements may be computed by treating the cull material to be yarded as additional gross merchantable volume with no net recovery.

A reasonably accurate estimate of the gross cull volume is essential. The total cost of yarding this volume by the means anticipated (tractor, high-lead, etc.) should be estimated in the same manner as for gross merchantable volume. This cost figure is carried into the yarding cost summary and becomes part of the total move-in, rigging, yarding and loading cost. Thus, the additional expense of "gross" yarding is reflected in the unit cost per MBF net volume.

L. Factor Determination.

1. Yarding Distances. To find the yarding distance for each area, the yarding distance factors found in the following tables are multiplied by the length of the side which is the denominator in the ratio. These factors apply to actual distances and areas. When used with a map layout, the result is not correct with respect to the actual yarding distance.

a. Tractor Logging. In order to allow for the weave and slope in tractor yarding, a factor must be applied to the average horizontal yarding distance as found on the map layout. In the absence of data pertinent to a particular situation, it is suggested that this distance be increased by 20 percent.

b. High-lead Logging. The slope factor in high-lead logging must be considered to determine actual distance. This can be done directly by drawing the setting layout to scale using actual slope distances to determine ratios and, thus, the yarding distance. However, sufficient accuracy can be obtained by calculating the average slope (tail block to base of lead pole) and applying a slope factor to the average horizontal yarding distance as determined through use of a map layout. Slope factors are found on Chart 5.



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c. Skyline Logging. As in yarding distance determination for high-lead logging, slope must be considered. However, ground slope and skyline slope are not synonymous. The latter is the slope of a chord from top of tower or spar tree at the landing to tail-hold anchor or top of tail spar, either of which may be located well outside the cutting area.

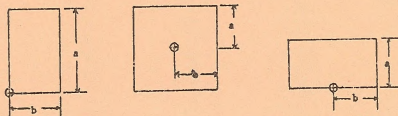
BLM time study data are based upon yarding distances measured along the average slope of skyline profile (ground slope) rather than skyline slope. Therefore, for skyline yarding, average ground slope should be measured or calculated from proposed spar location at landing to outer boundary of cutting area. With this exception, skyline yarding distance can be determined by the same procedures as high-lead yarding distance. See Chart 5 for slope factors.

d. Mobile Yard Loader Logging. The slope factor must also be considered to determine actual distance. Sufficient accuracy can be obtained by calculating the average slope from a point directly below the fairlead (on the boom) to the tail block and applying a slope factor to the average horizontal yarding distance as determined from a map layout. Slope factors are listed on Chart 5.

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## Chart 1 - Yarding Distance Determination

YARDING DISTANCE FACTOR BY RATIO OF SIDES

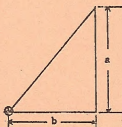
## LOGGING DIAGRAMS

Ratio $\frac{a}{b}$	"b" Factor	Ratio $\frac{a}{b}$	"b" Factor	Ratio $\frac{a}{b}$	"b" Factor
.1	.50	2.9	1.57	5.7	2.91
.2	.51	3.0	1.61	5.8	2.95
.3	.53	3.1	1.66	5.9	3.01
.4	.55	3.2	1.71	6.0	3.06
.5	.58	3.3	1.76	6.1	3.11
.6	.61	3.4	1.80	6.2	3.16
.7	.64	3.5	1.85	6.3	3.21
.8	.67	3.6	1.90	6.4	3.26
.9	.71	3.7	1.95	6.5	3.31
1.0	.75	3.8	1.99	6.6	3.36
1.1	.78	3.9	2.04	6.7	3.40
1.2	.82	4.0	2.09	6.8	3.45
1.3	.86	4.1	2.14	6.9	3.50
1.4	.90	4.2	2.19	7.0	3.55
1.5	.94	4.3	2.23	7.1	3.60
1.6	.99	4.4	2.28	7.2	3.65
1.7	1.03	4.5	2.33	7.3	3.70
1.8	1.07	4.6	2.38	7.4	3.75
1.9	1.11	4.7	2.43	7.5	3.80
2.0	1.16	4.8	2.48	7.6	3.85
2.1	1.20	4.9	2.52	7.7	3.90
2.2	1.25	5.0	2.57	7.8	3.95
2.3	1.29	5.1	2.62	7.9	4.00
2.4	1.34	5.2	2.67	8.0	4.05
2.5	1.38	5.3	2.72	8.5	4.29
2.6	1.43	5.4	2.77	9.0	4.54
2.7	1.48	5.5	2.82	9.5	4.79
2.8	1.52	5.6	2.87	10.0	5.04

Divide "a" distance by "b" distance to determine ratio  $\frac{a}{b}$ . Multiply "b" distance by "b" factor to determine yarding distance. You may select either of the two distances for "a" distance. However, it is recommended that "b" distance be the shorter of the two.

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Chart 2 - Yarding Distance Determination

YARDING DISTANCE FACTOR BY RATIO OF SIDES



LOGGING DIAGRAMS

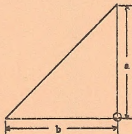
Ratio "a" "b"	"b" Factor	Ratio "a" "b"	"b" Factor	Ratio "a" "b"	"b" Factor
.1	.67	2.9	1.17	5.7	2.01
.2	.67	3.0	1.20	5.8	2.05
.3	.67	3.1	1.23	5.9	2.08
.4	.68	3.2	1.26	6.0	2.11
.5	.69	3.3	1.29	6.1	2.14
.6	.70	3.4	1.31	6.2	2.17
.7	.71	3.5	1.34	6.3	2.20
.8	.72	3.6	1.37	6.4	2.24
.9	.73	3.7	1.40	6.5	2.27
1.0	.75	3.8	1.43	6.6	2.30
1.1	.76	3.9	1.46	6.7	2.33
1.2	.78	4.0	1.49	6.8	2.36
1.3	.80	4.1	1.52	6.9	2.39
1.4	.81	4.2	1.55	7.0	2.43
1.5	.83	4.3	1.58	7.1	2.46
1.6	.85	4.4	1.61	7.2	2.49
1.7	.87	4.5	1.64	7.3	2.52
1.8	.90	4.6	1.67	7.4	2.56
1.9	.92	4.7	1.70	7.5	2.59
2.0	.94	4.8	1.73	7.6	2.62
2.1	.97	4.9	1.76	7.7	2.65
2.2	.99	5.0	1.80	7.8	2.68
2.3	1.02	5.1	1.83	7.9	2.72
2.4	1.04	5.2	1.86	8.0	2.75
2.5	1.07	5.3	1.89	8.5	2.91
2.6	1.09	5.4	1.92	9.0	3.07
2.7	1.12	5.5	1.95	9.5	3.24
2.8	1.15	5.6	1.98	10.0	3.40

Divide "a" distance by "b" distance to determine ratio  $\frac{a}{b}$ . Multiply "b" distance by "b" factor to determine yarding distance.

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Chart 3 - Yarding Distance Determination

YARDING DISTANCE FACTOR BY RATIO OF SIDES



LOGGING DIAGRAMS

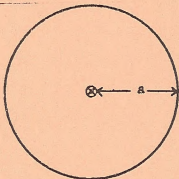
Ratio $\frac{a}{b}$	"b" Factor	Ratio $\frac{a}{b}$	"b" Factor	Ratio $\frac{a}{b}$	"b" Factor
.1	.33	2.9	1.02	5.7	1.93
.2	.34	3.0	1.05	5.8	1.96
.3	.35	3.1	1.09	5.9	1.99
.4	.36	3.2	1.12	6.0	2.03
.5	.37	3.3	1.15	6.1	2.06
.6	.39	3.4	1.18	6.2	2.09
.7	.41	3.5	1.21	6.3	2.13
.8	.43	3.6	1.25	6.4	2.16
.9	.45	3.7	1.28	6.5	2.19
1.0	.47	3.8	1.31	6.6	2.22
1.1	.50	3.9	1.34	6.7	2.26
1.2	.52	4.0	1.37	6.8	2.29
1.3	.55	4.1	1.41	6.9	2.32
1.4	.57	4.2	1.44	7.0	2.36
1.5	.60	4.3	1.47	7.1	2.39
1.6	.63	4.4	1.50	7.2	2.42
1.7	.66	4.5	1.54	7.3	2.46
1.8	.69	4.6	1.57	7.4	2.49
1.9	.72	4.7	1.60	7.5	2.52
2.0	.74	4.8	1.63	7.6	2.55
2.1	.77	4.9	1.67	7.7	2.59
2.2	.81	5.0	1.70	7.8	2.62
2.3	.84	5.1	1.73	7.9	2.65
2.4	.87	5.2	1.76	8.0	2.69
2.5	.90	5.3	1.80	8.5	2.85
2.6	.93	5.4	1.83	9.0	3.02
2.7	.96	5.5	1.86	9.5	3.18
2.8	.99	5.6	1.90	10.0	3.35

Divide "a" distance by "b" distance to determine ratio  $\frac{a}{b}$ . Multiply "b" distance by "b" factor to determine yarding distance. You may select either of the two distances for "a" distance. However, it is recommended that "b" distance be the shorter of the two.



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Chart 4 - Yarding Distance Determination  
YARDING DISTANCE FACTOR FOR A CIRCLE OR CIRCLE SECTOR



Yarding Distance = .67

Where landings are in the center of a circle or the apex of a circle sector, the radius of the circle or the distance from apex to perimeter of the sector is multiplied by a factor of .67 to determine the average yarding distance.

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Chart 5 - Yarding Distance DeterminationHIGH-LEAD LOGGING  
SLOPE DISTANCE FACTORS <sup>1/</sup>

<u>Per cent of Slope</u>	<u>Factor</u>
5	1.00
10	1.00
15	1.01
20	1.02
25	1.03
30	1.04
35	1.06
40	1.08
45	1.10
50	1.12
55	1.14
60	1.17
65	1.19
70	1.22
75	1.25
80	1.28
85	1.31
90	1.35
95	1.38
100	1.41

1/ Ratio of slope distance to horizontal distance.

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.34 Transportation. These costs include all expenses incurred in moving logs from woods landing to utilization center. Generally, these are trucking expenses; however, water transportation costs may be involved.

A. Standard Method. This involves timing of actual round trip truck hauling operations on specific road segments. Since this method is based upon empirical measurements of time, all physical effects of road geometrics (grade, alignment, width) and surface will be reflected in the recorded time.

All costs involved in moving merchantable material from loading point to utilization center will be evaluated. These costs will incorporate ownership and operating expenses for the average logging truck and round trip time and normal delay time for the truck.

1. Cost Factors.

a. Operating Time. Those periods when the truck is actually transporting logs to the destination or returning empty to the loading point. Operating time includes legally required stops at intersections and unavoidable delays in traffic, and other variable, unpredictable delays such as tightening binder chains, minor repairs made by driver, smoke breaks, conversation, etc.

b. Normal Delay Time. Those periods when the truck is on the job, but not in operating status. It includes relatively constant, predictable periods in two general categories:

(1) Observed Delays. Those caused by loading, unloading, scaling, weighing, etc. These delays are seen and recorded during collection of truck hauling data, and are part of total mean time per round trip.

(2) Fixed Delay. An allowance of 30 minutes per day is included to compensate for time spent in engine warmup and routine servicing and fueling of the truck. This allowance is based upon data collected from industry.

Normal delay time does not include any breakdown which requires shop repair, or the services of a skilled mechanic. The same is true of a spilled load of logs. Such an observation should be ended at the location where the breakdown or load loss occurs.

c. Round Trip Minute (RTM). The basic unit in measurement of round trip time from loading point to destination which includes observed delay time as defined in b (1) above.



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d. Destination. Point to which truck load of logs is delivered. It may be a utilization center, or it may be a log dump on a waterway or a reloading point on a railroad, intermediate between woods and utilization center.

e. Gross Load Volume. This is the gross volume of the average truck load of logs as estimated for a given area. It will vary with locality and type of material hauled (run-of-the-woods logs, logs from commercial thinnings, "cull" logs). Each BLM district should review its truck scale records periodically. These records should be used as a basis for predicting the average gross load volume for a given proposed sale.

The current PUC Gross Vehicle weight for log trucks is 80,000 lbs., computed as follows: 34,000 lbs. on each double axle and 12,000 lbs. on the steering axle.

f. Road Categories. Data will be kept in four broad classifications:

<u>Log Haul Road Class</u>	<u>Definition</u>	<u>Useable Width</u>
I	Highway	24 ft. and over
II	Two lane road	20 - 23+ ft.
III	Single lane road	12 - 19+ ft.
IV	Logging spur road	10 - 11+ ft.

2. Clocking Procedure. Road clocking can be accomplished by various means. A two-man crew can do the job, one man driving and reading the odometer while the other observes and serves as timekeeper and recorder.

Another method involves the use of a "cassette" type tape recorder with microphone equipped with on-off switch hung around the driver's neck for oral note taking. A stop watch is taped to the dashboard near the odometer for recordation of time and mileage. This technique reduces road clocking to a one-man operation, the driver functioning simultaneously as observer and recorder. Notes are later transcribed from tape to road clocking forms. Field testing indicates that this procedure is practical and efficient.

Road clocking may also be done by crews equipped with two-way radios. Since clocking can thus be done without actually following the truck under observation, driving is kept to a minimum. One radio-equipped crew member is stationed at the loading point, the others at critical check points (road junctions) along the route. The truck being timed is identified from station to station by physical description, make and license number.



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3. Number of Observations Required. This will depend upon the variation of the individual observations. A minimum of five sample runs, from loading point to destination (loaded) and from destination to loading point (empty) is required. If the total elapsed operating time of one of these observations should vary by more than thirty percent from the mean total operating time of all observations, it will be necessary to make five additional observations. In this case, all ten observations should be used in recomputing mean total operating time.

B. Alternative Method. This employs time data collected by past procedures, i.e., using distance, percent of rise and rate of rise and fall as independent variables. However, the alternative method derives costs from time data by essentially the same mechanics as used in the standard method.

The time tables following this section are based on hauling under virtually all of the conditions found in Oregon. The times have been related only to the variables distance, percent of rise and rate of rise and fall. In the selection of areas in which to make studies, the factor of road alignment, as it limits rate of travel, was considered. Therefore, while it is not possible to isolate as an individual variable, some reduction in speed due to road alignment has been introduced through the sample.

1. Cost Factors.

a. Percent of Rise. The percent of rise is that portion of undulating road over which the truck has to move its load uphill; it is found by dividing the total rise by the total rise and fall. If the total change in elevation for a given road is 1,200 feet of which 300 feet is uphill travel, the "percent of rise" would be 25%. Since Charts 1, 2, and 3 are graduated in increments of ten percent, 25% would fall in the 20% to 30% class.

b. Rate of Rise and Fall. Rate of rise and fall is the total change in elevation of any road compared to its total length. If a road 10 miles (52,820 feet) in length had a total rise and fall of 5,000 feet, the rate of rise and fall would be -

$$9.46\%, \text{ rounded to } 9.5\% \qquad \frac{5,000 \text{ feet}}{52,820 \text{ feet}}^{\text{or}}$$

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c. Surface.

(1) Hardtop.

- (a) Concrete, any lane width
- (b) Black top, any lane width
- (c) Gravel, when two-lane width, road surface 1-inch minus material, well graded and compacted; good visibility
- (d) Dirt, when two-lane width, road surface well graded and compacted; good visibility

(2) Gravel. All gravel roads other than (c) above.

(3) Dirt. All dirt roads other than (d) above.

d. Log Scale Recovery. Log scale recovery in this section is the appraiser's estimate of the percent of the material hauled from the woods which will be recovered in products.

e. Operating Time. Those periods when the truck is available for transporting logs. Operating time (under the alternative method) includes a constant allowance of 40 minutes per round trip, which is added to the total clocked time to cover loading and unloading, scaling, weighing, unavoidable delays in traffic, legally required stops at intersections, and other variable, unpredictable delays such as tightening binder chains, minor repairs made by driver, smoke breaks, conversation, etc.

f. Fixed Delay Time. An allowance of 30 minutes per day is included to compensate for time spent in engine warmup and routine servicing and fueling of the truck. This allowance is based upon data collected from industry.

g. Truck (On Highway). Diesel or gasoline truck and trailer combination with maximum 8-foot bunks and legal restriction on gross weight. See footnote 1, Chart 5.

h. Truck (Off Highway). Diesel or gasoline truck and trailer combination not restricted to "on Highway" bunk width and gross weight limitations. See footnote 2, Chart 5.

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2. Clocking Procedure. To use the following five charts, measurements of rise, fall, and mileage must be made on the road to be used.

a. Rise and Fall. The easiest method of measuring the rise and fall in a road is with a sensitive type altimeter (Wallace and Tiernan or equivalent) which can be read to the nearest two feet. When using a base instrument, two runs should be made over the road at any time of the day. When the base is not used, the two runs must be made between six and ten in the morning or from three to six in the afternoon. This is due to barometric and temperature change. It cannot be too greatly stressed that all rises and all falls must be measured. The instrument must be level and allowed to come to rest before moving to the next reading. When allowing for transportation on roads not yet constructed, the appraiser shall estimate the changes in elevation to the best of his ability.

b. Mileage. Mileage can be read from the odometer to the nearest tenth of a mile. All important road junctions should be noted and the mileage thereto recorded.



## 9353.3 - PRODUCTION COSTS

(Schedule 20)

Chart 1 - Alternative Transportation MethodROUND TRIP TIME - HARD SURFACE

Minutes per Mile

Rate of Rise & Fall	Per cent of Rise <sup>1/</sup>									
	0-10 Min.	10-20 Min.	20-30 Min.	30-40 Min.	40-50 Min.	50-60 Min.	60-70 Min.	70-80 Min.	80-90 Min.	90-100 Min.
0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
0.5	3.0	3.0	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.2
1.0	3.1	3.1	3.2	3.2	3.2	3.2	3.3	3.3	3.3	3.4
1.5	3.2	3.2	3.3	3.3	3.4	3.5	3.5	3.6	3.6	3.7
2.0	3.3	3.4	3.5	3.5	3.6	3.7	3.8	3.9	4.0	4.1
2.5	3.4	3.5	3.7	3.8	3.9	4.0	4.2	4.3	4.4	4.6
3.0	3.6	3.7	3.9	4.1	4.3	4.5	4.6	4.8	4.9	5.1
3.5	3.8	4.0	4.2	4.4	4.6	4.9	5.1	5.3	5.5	5.8
4.0	4.0	4.2	4.5	4.8	5.1	5.4	5.7	5.9	6.2	6.5
4.5	4.2	4.5	4.9	5.2	5.5	5.9	6.2	6.6	6.9	7.3
5.0	4.4	4.8	5.3	5.7	6.1	6.6	7.0	7.4	7.8	8.3
5.5	4.7	5.2	5.7	6.2	6.8	7.2	7.7	8.2	8.8	9.3
6.0	5.0	5.5	6.1	6.7	7.3	8.0	8.5	9.1	9.8	10.3
6.5	5.3	5.9	6.6	7.3	8.0	8.8	9.5	10.1	10.8	11.6
7.0	5.6	6.4	7.2	8.0	8.8	9.4	10.4	11.2	12.0	12.8
7.5	5.9	6.8	7.7	8.7	9.6	10.5	11.4	12.3	13.2	14.1
8.0	6.3	7.3	8.4	9.4	10.4	11.5	12.5	13.5	14.6	15.6
8.5	6.7	7.8	9.0	10.1	11.3	12.5	13.6	14.7	15.9	16.1
9.0	7.1	8.4	9.7	11.0	12.3	13.6	14.9	16.2	17.5	18.8
9.5	7.6	9.0	10.4	11.9	13.3	14.7	16.1	17.6	19.0	20.5
10.0	8.0	9.6	11.2	12.8	14.3	15.9	17.5	19.1	20.7	22.2

<sup>1/</sup> Per cent of rise figured in direction of loaded truck. Round-trip time is that time required for a loaded truck to travel one mile and return.

## 9353.3 - PRODUCTION COSTS

(Schedule 20)

Chart 2 - Alternative Transportation MethodROUND TRIP TIME - GRAVEL SURFACE

Minutes per Mile

Rate of Rise & Fall	Per cent of Rise <sup>1/</sup>									
	0-10 Min.	10-20 Min.	20-30 Min.	30-40 Min.	40-50 Min.	50-60 Min.	60-70 Min.	70-80 Min.	80-90 Min.	90-100 Min.
0.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
0.5	5.0	5.0	5.0	5.1	5.1	5.1	5.2	5.2	5.2	5.2
1.0	5.0	5.0	5.1	5.2	5.2	5.3	5.3	5.4	5.4	5.5
1.5	5.1	5.2	5.3	5.4	5.5	5.5	5.6	5.7	5.8	5.9
2.0	5.3	5.4	5.5	5.6	5.7	5.9	6.0	6.1	6.2	6.3
2.5	5.5	5.7	5.8	6.0	6.2	6.3	6.5	6.7	6.9	7.0
3.0	5.8	6.0	6.2	6.4	6.6	6.8	7.0	7.2	7.5	7.7
3.5	6.1	6.4	6.7	6.9	7.2	7.5	7.7	8.0	8.3	8.5
4.0	6.5	6.8	7.1	7.5	7.8	8.1	8.5	8.8	9.1	9.4
4.5	7.0	7.4	7.8	8.2	8.6	9.0	9.4	9.8	10.2	10.6
5.0	7.5	8.0	8.4	8.9	9.4	9.8	10.3	10.7	11.2	11.7
5.5	8.1	8.7	9.2	9.8	10.3	10.8	11.4	11.9	12.4	13.0
6.0	8.8	9.4	10.0	10.6	11.2	11.8	12.4	13.0	13.7	14.2
6.5	9.5	10.1	10.8	11.5	12.2	12.9	13.5	14.2	14.9	15.5
7.0	10.1	10.8	11.6	12.3	13.1	13.9	14.6	15.3	16.1	16.8
7.5	10.8	11.6	12.4	13.2	14.1	14.9	15.7	16.8	17.3	18.1
8.0	11.4	12.3	13.2	14.1	15.0	15.9	16.7	17.7	18.8	19.5
8.5	12.1	13.0	14.0	15.0	15.9	16.9	17.9	18.8	19.8	20.8
9.0	12.7	13.7	14.8	15.8	16.8	17.9	18.9	20.0	21.0	22.0
9.5	13.4	14.5	15.6	16.7	17.8	18.9	20.0	21.1	22.3	23.4
10.0	14.0	15.2	16.4	17.5	18.7	19.9	21.1	22.3	23.5	24.7

<sup>1/</sup> Per cent of rise figured in direction of loaded truck. Round-trip time is that time required for a loaded truck to travel one mile and return.

## 9353.3 - PRODUCTION COSTS

(Schedule 20)

Chart 3 - Alternative Transportation MethodROUND TRIP TIME - DIRT SURFACE

Minutes per Mile

Rate of Rise & Fall	Per cent of Rise <sup>1/</sup>									
	0-10 Min.	10-20 Min.	20-30 Min.	30-40 Min.	40-50 Min.	50-60 Min.	60-70 Min.	70-80 Min.	80-90 Min.	90-100 Min.
0.0	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
0.5	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
1.0	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
1.5	7.9	7.9	8.0	8.0	8.0	8.1	8.1	8.1	8.2	8.2
2.0	7.9	8.0	8.0	8.1	8.2	8.2	8.3	8.4	8.4	8.5
2.5	7.9	8.0	8.2	8.3	8.4	8.5	8.7	8.8	8.9	9.0
3.0	7.9	8.1	8.3	8.5	8.7	8.8	9.0	9.2	9.4	9.6
3.5	8.1	8.4	8.6	8.9	9.1	9.4	9.6	9.9	10.1	10.4
4.0	8.3	8.6	8.9	9.3	9.6	9.9	10.2	10.6	10.9	11.2
4.5	8.7	9.1	9.5	9.9	10.3	10.7	11.1	11.5	11.9	12.3
5.0	9.1	9.6	10.1	10.5	11.0	11.5	12.0	12.4	12.9	13.4
5.5	9.7	10.2	10.8	11.3	11.8	12.4	12.9	13.4	14.0	14.5
6.0	10.3	10.9	11.5	12.0	12.6	13.2	13.8	14.4	15.0	15.6
6.5	11.1	11.7	12.3	12.9	13.6	14.2	14.8	15.4	16.0	16.7
7.0	11.8	12.5	13.1	13.8	14.5	15.1	15.8	16.5	17.1	17.8
7.5	12.8	13.5	14.2	14.8	15.5	16.2	16.9	17.5	18.2	18.9
8.0	13.7	14.4	15.1	15.8	16.5	17.2	17.9	18.6	19.3	20.0
8.5	14.7	15.4	16.1	16.9	17.5	18.2	19.0	19.7	20.4	21.1
9.0	15.6	16.3	17.1	17.8	18.5	19.3	20.0	20.7	21.5	22.2
9.5	16.6	17.3	18.1	18.8	19.6	20.3	21.1	21.8	22.6	23.3
10.0	17.5	18.3	19.0	19.8	20.6	21.3	22.1	22.9	23.6	24.4
10.5	18.5									
11.0	19.4									
11.5	20.3									
12.0	21.3									
12.5	22.3									
13.0	23.3									
13.5	24.2									
14.0	25.0									
14.5	26.1									
15.0	27.0									

<sup>1/</sup> Per cent of rise figured in direction of loaded truck. Round-trip time is that time required for a loaded truck to travel one mile and return.



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Chart 4 - Alternative Transportation Method

WEIGHT RANGES BY SPECIES  
(Pounds per Board Foot)

Douglas-fir	5.5 - 13.5 lb.	<u>1/</u>	Port-Orford-cedar	6.0 - 10.3 lb.
Ponderosa pine	6.5 - 11.5 lb.		Hemlock	8.4 - 11.8 lb.
Sugar pine	7.0 - 11.5 lb.		White fir	8.6 - 10.0 lb.
Spruce	5.0 - 7.5 lb.		Larch	6.5 - 10.0 lb.

1/ Use 11.0 lbs. as standard for commercial thinnings.

However, this log weight may be varied if well-documented experience indicates that other log weight averages are locally more applicable. Other log weight averages, if used, should be based upon accurate truck scale records and actual load weights from weighing stations. Load weights exceeding legal limits should not be used as basic data.

Variation from the standard 11.0 lbs. per board foot will affect both log hauling and loading costs. Fixed loading time for variable average weights will have to be computed and total loading time and cost adjusted accordingly.

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Chart 5 - Alternative Transportation Method

NET VOLUME IN MBF PER LOAD 1/ 2/

Log Wt. per Bd. Ft.	Log Scale Recovery in Per cent						
	100	95	90	85	80	75	70
7.0	7.571	7.193	6.814	6.435	6.057	5.678	5.300
7.5	7.067	6.714	6.360	6.007	5.654	5.300	4.947
8.0	6.625	6.294	5.963	5.631	5.300	4.969	4.638
8.5	6.235	5.923	5.612	5.300	4.988	4.676	4.365
9.0	5.889	5.595	5.300	5.006	4.711	4.417	4.122
9.5	5.579	5.300	5.021	4.742	4.463	4.184	3.905
10.0	5.300	5.035	4.770	4.505	4.240	3.975	3.710
10.5	5.048	4.796	4.543	4.291	4.038	3.786	3.534
11.0	4.818	4.577	4.336	4.095	3.854	3.614	3.373

1/ Estimated average gross weight - loaded log truck and trailer-

Net weight of log truck and trailer-

Load Weight-

78,000 lbs.

-25,000 lbs.

53,000 lbs.

2/ This table is intended only as an Alternative Method guide for estimating cost of transportation by "on highway" trucks. Experience may indicate that these load volumes are commonly exceeded by local practice. For example, timber sale access may be by roads on which "off highway" loadings are permitted. The appraiser should use the average net load volume which best fits the given situation.

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.35 Road Construction and Maintenance.

A. Engineering. Illustration 4, Table 1, is the expenses of engineering designed roads which may be constructed under terms of a timber sale contract. Engineering costs are not allowed for non-designed roads which require only a centerline location and grade established by BLM. The allowance for the total job--survey, design and slope staking--is the estimated cost of accomplishing this work on a centerline location previously designated by BLM. Table 1 covers engineering costs for western Oregon.

B. Move-in. Illustration 4, Table 2, covers the cost of moving the minimum essential road building equipment from one job to another. A moving distance of 70 miles is considered average for the heavy transport, flag car and crews for move-in. This covers distance from town to previous job area, on to new job area, and return to town. Many loggers presently use two tractors in road construction, one equipped with dozer blade and ripper (without towing winch) and one with dozer blade and towing winch. The latter machine is herein considered a logging tractor; its moving cost is excluded from the road construction move-in cost allowance. See Illustration 4, Table 2 for components of the basic move equipment. If it is anticipated that additional equipment (wheel scraper, shovel, roller, dump truck, loader) will be used, the basic road construction move-in allowance must be increased accordingly.

C. Clearing and Grubbing. Grubbing is the removal of stumps from the ground by any one of several methods or combination of methods. It does not include the pushing of stumps and fragments from the right-of-way. Clearing is the removal of loosened or fragmented stumps, brush, debris and logs (other than yarding) from the limits of construction. Decking of right-of way logs (where necessary) is considered part of the clearing operation. Yarding of right-of-way logs is essentially a logging operation rather than a part of road construction.

1. Acreage Determination. Grubbing and clearing acreages were computed from the average cross sections used for determining common excavation yardages on roads actually constructed. The tabular figures are slope or surface acres. These are intended for use when it is impractical to determine surface area from cross sections or by other means.

a. Grubbing Acreages. These acreages include the area from top of cut to toe of fill by percent of side slope. These acreages are for use when there is no separate tally of trees within the road prism. The appraiser must then compute a grubbing cost by using the average d.b.h. and number of stems per acre indicated by cruise data.



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b. Clearing Acreages. These acreages represent the area which must be cleared for each 100' station by percent side slope. This area is based upon the distance from a point 10 feet (on slope) above the top of the cut to a point 5 feet (on slope) below the toe of the fill.

c. Turnout Acreages. Turnout acreages represent additional slope areas, beyond the scope of clearing for subgrades of standard width, which must be grubbed and cleared for turnout excavation. The table lists these acreages in two forms: acres per turnout and acres per station of turnout. The latter data are for use when turnout lengths vary. The number of stations of turnout may be determined by field measurement and formula:

Number of Stations of Turnout =

$$\frac{\text{Length of Turnout in Feet} + \text{Length of One Approach in Feet}}{100}$$

Refer to Chart 1 for acreages by station of road and turnouts.

2. Grubbing. Illustration 4, Table 3 costs are based upon averages for several different methods of removal, including loading and shooting with explosives, splitting with tractor attachment, and under-cutting. Studies indicate that stumps of trees under 24 inches d.b.h. are usually pushed out by tractor mounted dozer, without grubbing.

3. Clearing. Illustration 4, Table 3 costs are based upon surface acres actually cleared. There is no apparent relationship between percent side slope and clearing cost per acre.

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Chart 1 - Road Construction Clearing & GrubbingGRUBBING AND CLEARING ACREAGES

% Side Slope	Acres per Station				Additional Acres - Turnouts			
	14' Subgrade		20' Subgrade		14' Subgrade		20' Subgrade	
	10' Usable Width		12' Usable Width		10' Usable Width 1/		12' Usable Width 2/	
	Grubbing	Clearing	Grubbing	Clearing	Acres/ Turnout	Ac/Sta. of Turnout	Acres/ Turnout	Ac/Sta. of Turnout
0	.051	.085	.078	.113	.016	.021	.046	.023
10	.051	.085	.078	.113	.016	.021	.046	.023
20	.057	.092	.078	.113	.017	.023	.056	.028
30	.060	.094	.083	.117	.026	.034	.070	.035
40	.087	.101	.090	.124	.040	.053	.110	.055
50	.076	.110	.092	.126	.050	.067	.132	.076
60	.073	.096	.122	.156	.074	.099	.120	.060
70	.078	.101	.101	.124	.033	.044	.088	.044
80	.087	.110	.115	.138	.036	.048	.102	.051
90	.089	.121	.131	.154	.057	.076	.114	.057
100	.115	.138	.154	.177	.062	.083	.128	.064

1/ Standard lengths: 50 foot turnout plus two 25 foot approaches.

2/ Standard lengths: 100 foot turnout plus two 50 foot approaches.

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D. Excavation. Excavation is the removal and relocation of various types of earth and rock encountered in building roads. It includes tractor and other machine work, manual labor and, when appropriate, the drilling and blasting of rock. Yardage figures in Illustration 4, Tables 4 through 8, are based upon actual field measurements. The tables are intended for use only when computed earthwork volumes are not available for a proposed road. Tables for common excavation are based upon cut slopes of 3/4:1 for side slopes up to 50 percent and 1/2:1 for side slopes over 50 percent. Tables for rock excavation are based upon a 1/4:1 cut slope. Both road classes (14 foot subgrade - 10 foot usable width, and 20 foot subgrade - 12 foot usable width) employ a ditch 3 feet wide as measured horizontally from ditch bottom to inside edge of roadbed. Common is that material which can be moved without blasting or ripping.

Rock is that material which must be drilled and blasted, or ripped by heavy tractor with ripper attachment, before it can be moved.

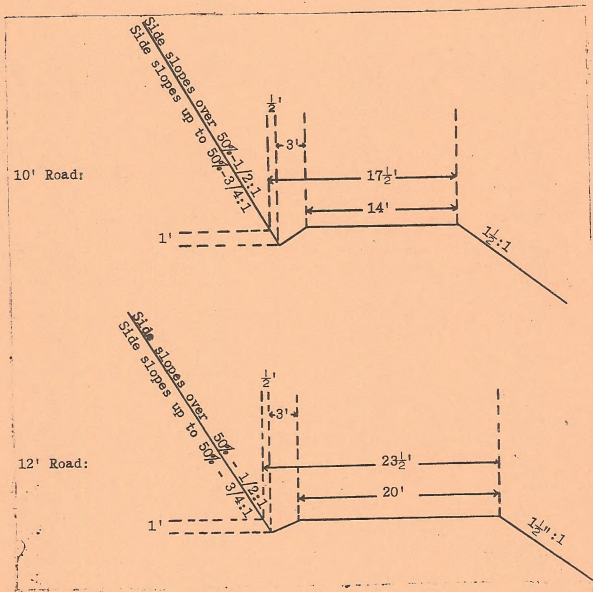
1. Common Excavation - Per Yard. Illustration 4, Table 4 cost is based upon time required for sidecasting the material with a maximum drift distance of 100 feet, mass center of cut to mass center of fill. When average freehauls will exceed 100 feet, the unit costs should be appropriately increased (Table 9), or cost allowance computed for the use of a wheel scraper (Table 10).

2. Rock Excavation - Per Yard. Illustration 4, Table 4 is an average cost of drilling and blasting or ripping, and moving the shattered rock. This cost is based upon empirical data obtained from recent studies. These studies covered a wide range of equipment and methods, including conventional drilling and blasting. Again, the maximum drift distance was 100 feet.



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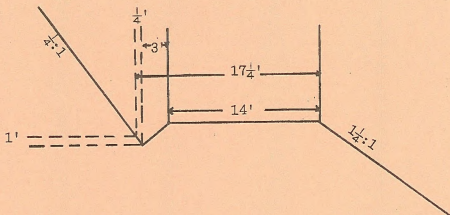
3. Common Excavation - Per Station. Illustration 4, Tables 5 and 6, cover cubic yardages per station for use in appraising non-designed roads. These volumes are based upon the average end areas of roads on which measurements were taken before and after construction. It may be noticed that there is considerable loss of material; these are not balanced cross sections. Average cuts at center line are included for the appraiser's information. When the actual cuts will differ appreciably from these averages, appropriate adjustments in yardage should be made. Cross sections in the studies generally conformed to the diagrams.



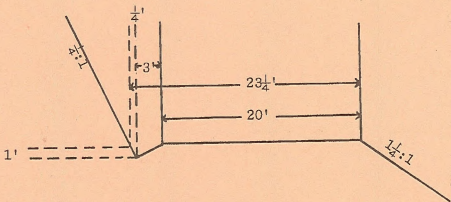
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4. Rock Excavation - Per Station. Illustration 4, Tables 5 and 6 costs for rock excavation are based upon the typical cross sections in the diagrams. Cubic yardages per station and average cuts at centerline are included.

10' Road



12' Road

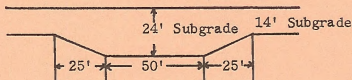


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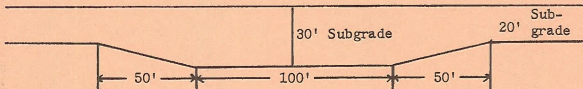
5. Turnout Excavation. Illustration 4, Tables 7 and 8 contain costs covering end areas and cubic yardages of turnout excavation determined from field measurements. The yardages represent the additional excavation beyond that required for the standard subgrade widths. Turnouts are 10 feet wider than the normal road width. For the 14 foot subgrade, the turnout is 50 feet long with a 25 foot approach at each end. The 20 foot subgrade requires a turnout 100 feet long, with two 50 foot approaches. The width of each approach ranges from 0 feet at the end which meets the standard subgrade to 10 feet where the approach joins the turnout.

Turnout Diagrams (plan view):

10' Road



12' Road





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6. Drift Allowance. Illustration 4, Table 9 is intended for use as a guide for increasing tractor excavation costs when the maximum drift of material exceeds 100 feet. The percentage increases apply to tractor excavation cost only and should not be used to adjust the costs of drilling and blasting rock.

7. Excavation and End Haul. Illustration 4, Table 10 costs are based upon the machine rates and production of a pusher tractor of 300 fly-wheel horsepower and a rental self-propelled wheel scraper hauling unit of 20 cubic yards heaped capacity. This method of moving material is adapted to distances beyond the maximum effective drift of a tractor mounted dozer. When excavation and end haul costs are used, allowance must be included for moving in the wheel scraper.

8. Shovel Excavation. Illustration 4, Tables 11 and 12 costs are based upon the use of rental 3/4 yard shovel. If shovel excavation is anticipated, the appraiser must include a shovel move-in cost allowance.

E. Culverts. Illustration 4, Tables 13 and 14, list costs of culverts. The cross-sectional area, usual gage and installed price per foot are given for galvanized, corrugated sheet metal culvert pipe of various types and sizes. The cost shown contains allowances for basic delivered price, connecting bands, beveling, shop elliptical forming (where necessary), structural excavation, installation and backfill. Beveling cost covers the expense of bringing both ends of culvert to the same bevel, 2:1 or less. Where perforated pipe is necessary, opinion is that 8" pipe will be adequate in nearly all cases. It is necessary to include gravel or crushed rock in the bed and backfill to assure drainage. All costs have been covered in the listed price.

F. Grading. Illustration 4, Table 18 is based on the use of a motor grader and the time required for finishing the subgrade and pulling the ditch or subgrades up to 20 feet in width, exclusive of ditch.

G. Surfacing.

1. Cost Factors. Illustration 4, Table 19 costs are based on the BLM time studies and averages from BPR contracts on BLM roads. When local rates or rental rates other than those listed in this schedule are used, an explanation should be required in the appraisal.

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(Schedule 20)

a. Rock. Cost estimates for commercially produced crushed rock are obtained from local sources. Reliable contractors producing appropriate grade and type of rock in quantities required are contacted and price quotes requested specific to the road being appraised. The "total job" quote, i.e., cost of rock in place, is obtained whenever possible. If a "total job" quote cannot be obtained, additional costs such as hauling, spreading, etc., are obtained from other independent local contractors; from cost tables in this schedule; or calculated for the specific road.

Cost estimates for operator produced rock are used only when it is not possible or feasible to purchase rock from local supplies. The approach requires specialized experience and knowledge in crushing practices and equipment and quarry development. A definite site for each rock production quarry is required when using this approach.

Cost estimates for pit and bar run rock are developed for the specific road using local equipment rental rates and production rates.

b. Loading. Loading costs are intended as allowances where hauling from pit is contemplated. Costs are based on rental rate of the dump truck and ownership of a 2 to 2-1/2 cubic yard front end loader.

c. Hauling. No appreciable differences were found between hauling times on "green" (non-compacted) and "solid" (compacted) roads. If the road is soft enough to impede hauling, present BLM requirements would deny the purchaser credit for surfacing prior to compaction. In effect then, there should be no hauling over "green" roads. If an unusual situation should require hauling over a soft roadbed, the appraiser should use his best judgment in estimating an adequate allowance for the additional cost. Costs are based on rental of the 10 to 12 cubic yard medium size dump truck.

d. Spreading. Spreading cost is on a per lift basis, i.e., for surfacing applied in two lifts, double the allowance. Costs are based on the road construction contractor owning the motor grader.





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Chart 1 - Road Construction Surfacing

CUBIC YARDS <sup>1/</sup> OF AGGREGATE PER 100' STATION

Usable Surfaced Road Width-Ft.	Compacted Depth in Inches									
	2	3	4	6	8	10	12	14	16	18
10	9	13	18	28	39	51	64	78	92	107
12	10	16	21	33	46	60	74	89	105	122
14	12	18	25	38	53	68	84	101	118	137
20	17	26	35	53	72	92	113	135	158	181
24	24	31	41	63	86	109	133	158	184	211

CUBIC YARDS <sup>1/</sup> OF AGGREGATE PER TURNOUT <sup>2/</sup>

Length of Turnout - Feet	Compacted Depth in Inches									
	2	3	4	6	8	10	12	14	16	18
50 <sup>3/</sup>	6	9	12	19	25	31	37	43	50	56
100 <sup>4/</sup>	12	18	24	38	50	62	74	86	99	111

CUBIC YARDS <sup>1/</sup> OF AGGREGATE PER 100' STATION OF TURNOUT <sup>5/</sup>

Cu. Yds./ 100 ft. of Turnout	Compacted Depth in Inches									
	2	3	4	6	8	10	12	14	16	18
	8	12	16	25	33	41	49	57	66	74

<sup>1/</sup> These figures are 1/3 higher than loose rock yardages (compaction allowance) and include allowance for edges sloped at 3:1.

<sup>2/</sup> Volumes related to length of turnout only; no relationship to class of road.

<sup>3/</sup> Includes volumes for two 25-foot approaches.

<sup>4/</sup> Includes volumes for two 50-foot approaches.

<sup>5/</sup> This table for use where turnout lengths vary.

9353.3 - PRODUCTION COSTS  
(Schedule 20)

Chart 2 - Road Construction Surfacing

SURFACE WIDENING ON FILLS -  
CUBIC YARDS OF AGGREGATE PER 100' STATION 1/

Extra Width - Feet	Compacted Depth in Inches									
	2	3	4	6	8	10	12	14	16	18
1	1	1	2	3	3	4	5	6	7	7
2	2	3	3	5	7	8	10	12	13	15

1/ Volumes for widening on one side of centerline only. On complete fills (no bench), make allowance for both sides.

SURFACE WIDENING ON CURVES -  
CUBIC YARDS OF AGGREGATE PER 100' STATION

Compacted Depth in Inches	Degree of Curve	8-21	22-35	36-51	52-64	65-75
	Extra Width in Feet	1	2	3	4	5
2		1	2	3	3	3
3		1	3	4	4	5
4		2	3	5	5	6
6		3	5	7	7	9
8		3	7	10	10	12
10		4	8	12	12	15
12		5	10	15	15	19
14		6	12	17	17	22
16		7	13	20	20	25
18		7	15	22	22	28

9353.3 - PRODUCTION COSTS  
(Schedule 20)

H. Road Maintenance. This cost allowance item consists of surface blading, ditch pulling, drainage upkeep and repair, slide removal, roadside brushing, roadside stabilization and gravel replacement costs. Determination of these costs as appraisal allowances should be based on condition surveys of the particular roads to be used.

Illustration 4, Table 20, contains a complete cost schedule for all items of road maintenance applicable for average and usual conditions.

1. Cost Factors.

a. Surfaced Roads. This represents an average cost of BLM Force Account maintenance, including current work. Amortization of surface replacement (wear) costs should be based upon current State Office instructions.

b. Unsurfaced Roads. This allowance should be sufficient to cover surface blading, ditch and culvert cleaning, slough removal and incidental work. It should not include costs of removal of major slides, heavy brush eradication or other extraordinary work.

c. Other Allowances. Where necessary and practical, allowances may be made for watering both surfaced and unsurfaced roads. When slides of major proportions must be removed, additional costs must be included. Slide removal costs and the costs of eradicating heavy roadside brush should be computed by district personnel on the basis of the best local information currently available.

2. Machine Rate Determination. When the condition survey indicates costs other than those in Table 20, the appraiser will estimate costs particular to the road being considered. In cases when a motor grader, road roller, shovel, dump truck or other equipment not normally owned by a contract logger is required, rental rates, either those in this schedule or local rates, shall be used.



9353.3 - PRODUCTION COSTS  
(Schedule 20).36 Fire Protection and Fuel Treatment.

A. Fire Protection. Illustration 5, Table 1 cost allowances are based on a fire season of eight months during which the tools and equipment must be ready for use. In addition, a watchman is required part time during a four-month period in midsummer. Since it is impossible to determine which part of the year a sale will be logged, the maximum allowance is made. Illustration 5, Table 2 cost schedule covers tractor and hand trail fire line construction.

B. Fuel Treatment. Illustration 5, Table 2 and 3 costs were developed from U.S. Forest Service data. These costs are not based on identifiable fuel loads, and they are intended only as guidelines. The appraiser should supplement them with local experienced costs when available.

9353.3 - PRODUCTION COSTS  
(Schedule 20)

.37 Other Allowances.

A. Seeding, Planting and Thinning. When these activities are a contractual requirement of a timber sale contract the appraiser should use current costs of similar type work performed in the local area through service on land treatment type contracts. Sources of cost data should include U.S. Forest Service, State and private industry.

B. Stream Clearing. It is sometimes necessary to require that the timber purchaser remove cull material from a stream channel to allow passage of anadromous fish or to improve drainage. Appraisal allowances for such contractual requirements may be computed by treating the cull material to be yarded as additional gross merchantable volume with no net recovery.

A reasonably accurate estimate of the gross cull volume is essential. The total cost of yarding this volume by the means anticipated (tractor, high-lead, etc.) should be estimated in the same manner as for gross merchantable volume. This cost figure is carried into the yarding cost summary and becomes part of the total move-in, rigging, yarding and loading cost. Thus, the additional expense of "gross" yarding is reflected in the unit cost per MBF net volume.

9353.3 - PRODUCTION COSTS  
(Schedule 20)

.38 Western and Eastern Oregon Manufacturing. Cost allowances pertaining to the manufacture of lumber and chips are obtained from Region 6 U.S. Forest Service and are based on collected costs from the lumber industry. These costs are updated annually.

Cost allowance for the manufacture of plywood is developed from costs experienced by plywood producers in the Douglas-fir region. The allowances are obtained from average costs of plywood plants reported to the American Plywood Association.

Plywood chip cost allowances for the conversion are developed from average costs experienced by local mills and plants reported to the Bureau of Land Management and U.S. Forest Service.

A. Western Oregon Douglas-fir Manufacturing Costs are made up of three components. These costs are for the manufacture of (1) lumber, obtained from the U.S. Forest Service; (2) plywood, obtained from costs experienced by plywood plants; and (3) chips, obtained from average costs experienced by local manufacturers.

1. Weights by manufacture in Illustration 7, Table 1 determines the extent that lumber and plywood costs are applied to individual log grades. Since some of the volume in each log is sawn and some is peeled, it is necessary to determine proportions of each log grade to be manufactured into lumber and plywood. These proportions (Table 1) are assumed to represent industry-wide practices.

2. Thinning manufacturing costs in Illustration 7, Table 2 are obtained from the U.S. Forest Service for log grades and sizes of logs predicted to come from thinning type timber, i.e., smaller diameter sawlogs.

B. Eastern Oregon Douglas-fir Manufacturing Costs are made up of two components. These costs are for the manufacture of (1) lumber, obtained from the U.S. Forest Service; (2) chips, obtained from average costs experienced by local manufactures.



# **TIMBER APPRAISAL PRODUCTION COST TABLES**

(Schedule 20)

ILLUSTRATION 1  
Falling & Bucking

ILLUSTRATION 2  
Rigging, Yarding & Loading

ILLUSTRATION 3  
Transportation

ILLUSTRATION 4  
Road Construction & Maintenance

ILLUSTRATION 5  
Fire Protection & Fuel Treatment

ILLUSTRATION 6  
Other Allowances

ILLUSTRATION 7  
Western & Eastern Oregon Manufacturing



TABLE 1

FALLING AND BUCKING  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME 1/ 3/

NO. OF 16' LOGS	PER CENT TOP LOSS 2/										
	0	5	10	15	20	25	30	35	40	45	50
1	15.65	15.50	15.35	15.15	15.00	14.85	14.70	14.50	14.35	14.20	14.00
2	12.90	12.65	12.50	12.30	12.15	12.00	11.85	11.65	11.50	11.35	11.15
3	10.35	10.15	10.00	9.85	9.70	9.50	9.35	9.20	9.05	8.85	8.70
4	8.25	8.10	7.90	7.75	7.60	7.45	7.25	7.10	6.95	6.75	6.60
5	6.55	6.35	6.20	6.05	5.90	5.70	5.55	5.40	5.20	5.05	4.90
6	5.20	5.05	4.85	4.70	4.55	4.40	4.20	4.05	3.90	3.70	3.55
7	4.25	4.05	3.90	3.75	3.60	3.40	3.25	3.10	2.95	2.75	2.60
8	3.65	3.50	3.35	3.15	3.00	2.85	2.70	2.50	2.35	2.20	2.05
9	3.45	3.30	3.15	2.95	2.80	2.65	2.50	2.30	2.15	2.00	1.85

1/ SUBTRACT \$0.10 FOR EVERY 7 STEMS PER ACRE.

2/ PER CENT TOP LOSS IS THE ESTIMATED AVERAGE VOLUME LOSS IN THE UPPER STEM FROM BREAKAGE AND ROT EXPRESSED AS A PER CENT OF GROSS VOLUME. THIS ESTIMATE CAN ONLY BE MADE BY THE CRUISER.

3/ DIRECTIONAL FELLING:

TREE JACKS - ADJUST TABULAR COSTS BY FACTOR OF 2.00.

TREE PULLING - ADJUST TABULAR COSTS BY FACTOR OF 3.00.

BASIC DATA, APPENDIX I, PAGES 71, 72, 266

FALLING AND BUCKING

9353.3 - PRODUCTION COSTS  
(Schedule 20)

Illustration 1, Page 1  
(.32)



9353.3 - PRODUCTION COSTS  
(Schedule 20)

FALLING AND BUCKING  
Eastern Oregon

TABLE 2

Costs in Dollars per MBF Net Merchantable Volume 1/

Per cent of  
Recovery 2/

100	9.80
95	10.15
90	10.40
85	10.70
80	11.00
75	11.45
70	11.75
65	12.10
60	12.50
55	12.90
50	13.30

1/ To nearest five cents.

2/ Per cent recovery expressed as the ratio of net merchantable volume to gross merchantable volume.

9353.3 - PRODUCTION COSTS  
(Schedule 20)

TABLE 3

FALLING AND BUCKING

UNMERCHANTABLE TREE AND SNAG FELLING

Western Oregon

<u>D.B.H.</u>	Cost in Dollars per Stem <u>1/</u>
8	\$ 0.90
12	1.50
16	2.05
20	2.65
24	3.25
28	3.85
32	4.45
36	5.05
40	5.65
44	6.20
48	6.80
52	7.40
56	8.00
60	8.60
64	9.20
68	9.80
72	10.35
76	10.95
80	11.55
84	12.15
88	12.75
92	13.35
96	13.95
100	14.50

1/ To nearest five cents.

Basic Data, Appendix 1, Pages 71,72 & 267

9353.3 - PRODUCTION COSTS  
(Schedule 20)

TABLE 4

FALLING AND BUCKING

UNMERCHANTABLE TREE AND SNAG FELLING

Eastern Oregon

<u>D.B.H.</u>	Cost in Dollars per Stem <u>1/</u>
8	\$ 0.80
12	1.30
16	1.85
20	2.35
24	2.90
28	3.40
32	3.95
36	4.45
40	5.00
44	5.50
48	6.05
52	6.55
56	7.05
60	7.60
64	8.10
68	8.65
72	9.15
76	9.70
80	10.20
84	10.75
88	11.25
92	11.80
96	12.30
100	12.85

1/ To nearest five cents

Basic Data, Appendix 1, Pages 75 & 267



9353.3 - PRODUCTION COSTS  
(Schedule 20)

FALLING AND BUCKING

TABLE 5

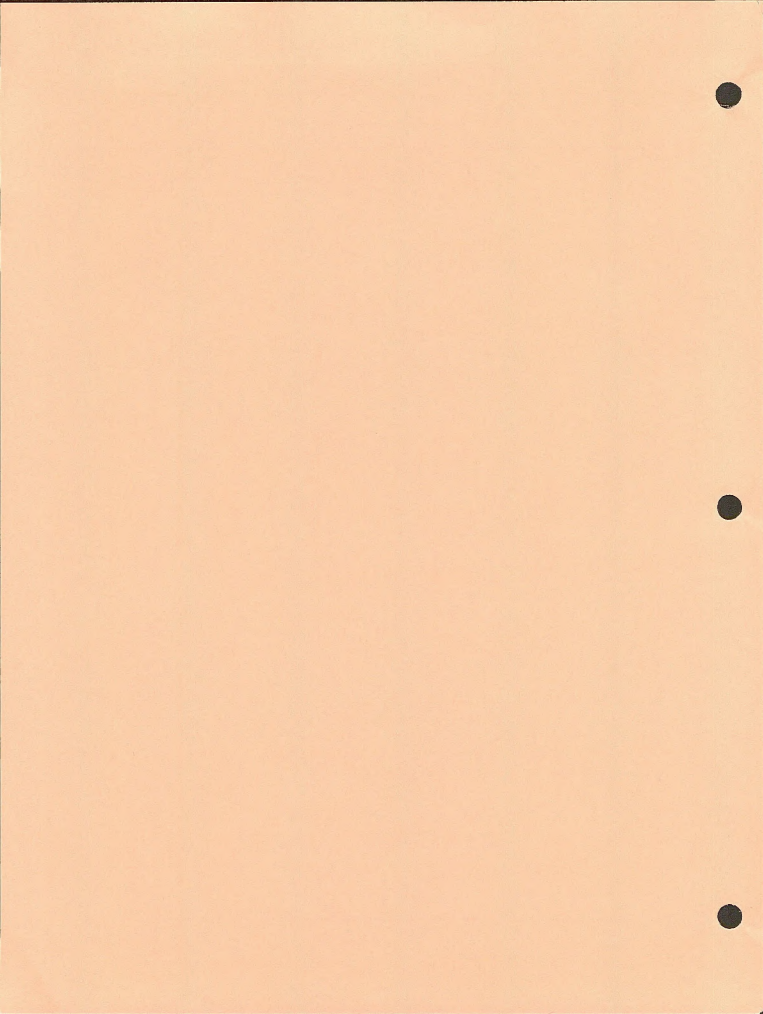
FALLING AND BUCKING - COMMERCIAL THINNINGS  
WESTERN OREGON

COSTS IN DOLLARS PER TREE 1/

D.B.H. INCHES	1	2	3	4	5	6	7	8	9	10	11
8	1.10	1.10	1.40	1.40							
10	1.20	1.20	1.55	1.55	1.85						
12	1.35	1.35	1.65	1.65	2.00	2.00					
14	1.50	1.50	1.85	1.85	2.15	2.15	2.50				
16	1.70	1.70	2.00	2.00	2.35	2.35	2.65	2.65			
18		1.90	2.25	2.25	2.55	2.55	2.85	2.85			
20		2.15	2.45	2.45	2.80	2.80	3.10	3.10	3.45		
22		2.40	2.70	2.70	3.05	3.05	3.35	3.35	3.70	3.70	
24		2.70	3.00	3.00	3.35	3.35	3.65	3.65	4.00	4.00	4.30
26			3.30	3.30	3.65	3.65	3.95	3.95	4.30	4.30	4.60
28			3.65	3.65	4.00	4.00	4.30	4.30	4.65	4.65	4.95
30			4.00	4.00	4.35	4.35	4.65	4.65	5.00	5.00	5.30

1/ COSTS ARE GOVERNED BY NUMBER OF BUCKING CUTS, WITH 32-FOOT LOG LENGTH AS STANDARD FOR EACH CUT.

BASIC DATA, APPENDIX 1, PAGES 73, 74 & 268



9353.3 - PRODUCTION COSTS  
(Schedule 20)  
RIGGING, YARDING AND LOADING

TABLE 1

MOVE-IN LOGGING EQUIPMENT 1/  
WESTERN OREGON

<u>Machine</u>	<u>Move-In Allowances</u>
Light Yarding Tractor Caterpillar D4D w/dozer and winch	\$ 90
Yarding Crawler Tractor Caterpillar D76 w/power shift FMC 210 CA	320 245
Rubber-tired Four-wheel skidder John Deere - 440 B	85
Swing Boom Yarder Washington 78A	530
Yarder-Portable 90' Tower Trailer Mounted with Berger Yarder	305
Yarder Portable 110' Tower Trailer Mounted with Skagit Yarder	720
Static Skyline - Portable 110' Tower Skagit BU98 Yarder (Distance 125 miles) Static Skyline - (move in costs per mile)	3225
Skyline	25.80/mile
Yarder tractor	4.50/mile
Mobile loader	8.05/mile
Basic Road Constructions Unit	\$15.00
Mobile Yarder Loader Skagit SJ-5R	205
Light Mobile Log Loader Barko Model 160	55
Heavy Mobile Log Loader Barko 450 - Tracked	565
Hydraulic " " Barko 450 - Rubber-tired	390
Front End Log Loader - Rubber-tired Caterpillar 966C	100
BLM Manual Supplement State Office-Oregon Supersedes Rel. 9-113	Rel. 9-121 6/20/77



9353.3 - PRODUCTION COSTS  
(Schedule 20)  
RIGGING, YARDING AND LOADING

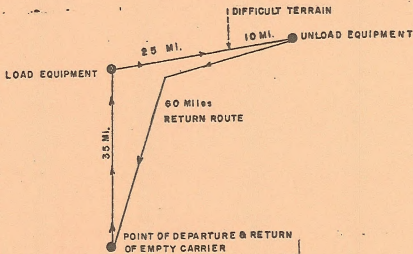
TABLE 1 (Cont')

1/ The average moving distance is assumed to be 35 miles. However, static skyline logging shows tend to be widely scattered, and loggers equipped for them are few. Moving distances vary greatly, but are generally much longer than for conventional logging. Thus, Skyline move in costs are shown here in terms of dollars per mile of moving distance rather than as total cost for moving each machine. Probably the appraiser can make a reasonably accurate prediction of moving distance for a given timber sale area. If not, 125 miles is suggested as an average moving distance.

2/ Move in costs were computed for these conditions:

- (1) The equipment will be actually moved 35 miles.
- (2) The empty truck rate is allowed for 60 miles.
- (3) Travel over mountainous or difficult terrain - 10 miles.

An example is:



The additional empty distance is used because many small communities which furnish manpower for logging do not have commercial hauling equipment capable of handling cats, etc. These have to be obtained from sources farther away.

Basic Data Appendix 1, Pages 77 thru 102

9353.3 - PRPDUCTION COSTS  
(Schedule 20)  
RIGGING, YARDING AND LOADING

TABLE 2

MOVE-IN LOGGING EQUIPMENT  
EASTERN OREGON

<u>Machine</u>	<u>Move-In Allowances</u>
Yarding Crawler Tractor	
Caterpillar D7G w/power shift	\$ 315
FMC 210 CA (Use Same Allowances As W. Ore.)	245
Mobile Log Loader	565
Hydraulic Barko 450 (Tracked)	
Mobile Yarder Loader	205
Skagit SJ-5R	

Basic Data Appendix 1, pages 103 thru 108

RIGGING, YARDING AND LOADING

TABLE 3

YARDING AND LOADING - TRACTOR OPERATIONS  
WESTERN OREGON

COSTS IN DOLLARS PER MCF GROSS VOLUME YARDED AND LOADED 1/

16 FT. LOG VOLUME Scrib. Dec.G.	100	200	300	400	500	600	700	800	900	1000
8	40.15	40.80	41.45	42.10	42.75	43.40	44.05	44.70	45.35	46.00
10	33.20	33.85	34.50	35.15	35.80	36.50	37.15	37.80	38.45	39.10
12	27.55	28.20	28.85	29.55	30.20	30.85	31.50	32.15	32.80	33.45
14	22.95	23.60	24.25	24.90	25.55	26.20	26.90	27.55	28.20	28.85
16	19.20	19.85	20.50	21.15	21.80	22.45	23.10	23.75	24.40	25.05
18	16.15	16.80	17.45	18.10	18.75	19.40	20.05	20.70	21.35	22.00
20	13.65	14.30	14.95	15.60	16.25	16.90	17.55	18.20	18.85	19.50
22	11.60	12.30	12.95	13.60	14.25	14.90	15.55	16.20	16.85	17.50
24	10.00	10.65	11.30	11.95	12.60	13.25	13.90	14.55	15.20	15.85
26	8.65	9.30	9.95	10.60	11.25	11.90	12.55	13.20	13.85	14.50
28	7.75	8.30	8.85	9.55	10.20	10.85	11.50	12.15	12.80	13.45
30	7.05	7.60	8.15	8.65	9.30	9.95	10.60	11.25	11.90	12.55
35	5.85	6.40	6.90	7.45	8.00	8.50	9.15	9.80	10.45	11.10
40	5.20	5.70	6.25	6.80	7.30	7.85	8.35	8.95	9.60	10.25
45	4.85	5.40	5.90	6.45	6.95	7.50	8.05	8.55	9.20	9.85
50	4.70	5.25	5.75	6.30	6.85	7.35	7.90	8.40	9.00	9.65
55	4.70	5.20	5.75	6.25	6.80	7.35	7.85	8.40	9.00	9.65
60	4.75	5.25	5.80	6.30	6.85	7.40	7.90	8.45	9.05	9.70
65	4.80	5.35	5.90	6.40	6.95	7.50	8.00	8.55	9.15	9.80
70	4.95	5.45	6.00	6.55	7.05	7.60	8.15	8.65	9.30	9.95
75	5.10	5.60	6.15	6.65	7.20	7.75	8.25	8.85	9.50	10.15
80	5.20	5.75	6.30	6.80	7.35	7.90	8.40	9.00	9.65	10.30

1/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

2/ DISTANCE LOGS ACTUALLY TRAVEL FROM CHOKER SETTING POINT TO THE LANDING.

3/ FOR DISTANCES EXCEEDING 1,000', ADD \$0.65 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX 1, PAGES 109, 110, 113, 114, 270 &amp; 271

9353.3 - PRODUCTION COSTS  
(Schedule 20)

RIGGING, YARDING AND LOADING

TABLE 4

TRACTOR YARDING  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED 1/

16 FT. LOG VOLUME SCRIB. DEC.G.	100	200	300	400	500	600	700	800	900	1000
8	32.70	33.20	33.75	34.25	34.80	35.35	35.85	36.40	36.95	37.45
10	27.05	27.60	28.10	28.65	29.20	29.70	30.25	30.75	31.30	31.85
12	22.45	23.00	23.50	24.05	24.60	25.10	25.65	26.15	26.70	27.25
14	18.70	19.25	19.75	20.30	20.85	21.35	21.90	22.40	22.95	23.50
16	15.65	16.15	16.70	17.25	17.75	18.30	18.85	19.35	19.90	20.40
18	13.15	13.70	14.20	14.75	15.25	15.80	16.35	16.85	17.40	17.95
20	11.10	11.65	12.20	12.70	13.25	13.75	14.30	14.85	15.35	15.90
22	9.45	10.00	10.55	11.05	11.60	12.10	12.65	13.20	13.70	14.25
24	8.15	8.65	9.20	9.70	10.25	10.80	11.30	11.85	12.40	12.90
26	7.05	7.55	8.10	8.65	9.15	9.70	10.25	10.75	11.30	11.80
28	6.15	6.70	7.25	7.75	8.30	8.80	9.35	9.90	10.40	10.95
30	5.45	6.00	6.50	7.05	7.60	8.10	8.65	9.20	9.70	10.25
35	4.25	4.80	5.30	5.85	6.40	6.90	7.45	7.95	8.50	9.05
40	3.60	4.10	4.65	5.20	5.70	6.25	6.75	7.30	7.85	8.35
45	3.25	3.75	4.30	4.85	5.35	5.90	6.45	6.95	7.50	8.00
50	3.10	3.65	4.15	4.70	5.20	5.75	6.30	6.80	7.35	7.90
55	3.05	3.60	4.15	4.65	5.20	5.75	6.25	6.80	7.30	7.85
60	3.10	3.65	4.20	4.70	5.25	5.80	6.30	6.85	7.35	7.90
65	3.20	3.75	4.30	4.80	5.35	5.85	6.40	6.95	7.45	8.00
70	3.35	3.85	4.40	4.95	5.45	6.00	6.50	7.05	7.60	8.10
75	3.45	4.00	4.55	5.05	5.60	6.15	6.65	7.20	7.70	8.25
80	3.60	4.15	4.70	5.20	5.75	6.25	6.80	7.35	7.85	8.40

1/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

2/ DISTANCE LOGS ACTUALLY TRAVEL FROM CHOKER SETTING POINT TO THE LANDING.

3/ FOR DISTANCES EXCEEDING 1,000', ADD \$0.55 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX 1, PAGES 109 & 110, 270 & 271



RIGGING, YARDING AND LOADING

TABLE 5

LOADING - TRACTOR OPERATIONS  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME LOADED 1/

16 FT. LOG VOLUME SCRIB. DEC.C.	YARDING DISTANCE IN FEET 2/ 3/									
	100	200	300	400	500	600	700	800	900	1000
A	7.45	7.55	7.70	7.80	7.95	8.05	8.15	8.30	8.40	8.55
10	6.15	6.30	6.40	6.55	6.65	6.75	6.90	7.00	7.15	7.25
12	5.10	5.25	5.35	5.50	5.60	5.70	5.85	5.95	6.10	6.20
14	4.25	4.40	4.50	4.60	4.75	4.85	5.00	5.10	5.25	5.35
16	3.55	3.70	3.80	3.95	4.05	4.15	4.30	4.40	4.55	4.65
18	3.00	3.10	3.25	3.35	3.50	3.60	3.70	3.85	3.95	4.10
20	2.55	2.65	2.80	2.90	3.00	3.15	3.25	3.40	3.50	3.60
22	2.15	2.30	2.40	2.50	2.65	2.75	2.90	3.00	3.15	3.25
24	1.85	1.95	2.10	2.20	2.35	2.45	2.60	2.70	2.80	2.95
26	1.60	1.75	1.85	1.95	2.10	2.20	2.35	2.45	2.55	2.70
28	1.60	1.60	1.65	1.75	1.90	2.00	2.15	2.25	2.35	2.50
30	1.60	1.60	1.60	1.60	1.75	1.85	1.95	2.10	2.20	2.35
35	1.60	1.60	1.60	1.60	1.60	1.60	1.70	1.80	1.95	2.05
40	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.65	1.70	1.80
45	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.70	1.85
50	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.65	1.80
55	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.65	1.80
60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.70	1.80
65	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.70	1.80
70	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.75	1.85
75	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.65	1.75	1.90
80	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.65	1.80	1.90

1/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

2/ DISTANCE LOGS ACTUALLY TRAVEL FROM CHOKER SETTING POINT TO THE LANDING.

3/ FOR DISTANCES EXCEEDING 1,000', ADD \$0.10 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX 1, PAGES 113 & 114, 270 & 271

YARDING AND LOADING - PARTIAL CUT TRACTOR OPERATIONS  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED AND LOADED 1/ 2/

TABLE 6A

16 FT. LOG VOLUME SCRIB. DEC.C.	YARDING DISTANCE IN FEET 3/ 4/									
	100	200	300	400	500	600	700	800	900	1000
8	59.45	60.65	61.90	63.10	64.35	65.55	66.80	68.00	69.20	70.45
10	50.95	52.20	53.40	54.65	55.85	57.10	58.30	59.55	60.75	61.95
12	44.00	45.20	46.40	47.65	48.85	50.10	51.30	52.55	53.75	55.00
14	38.20	39.40	40.65	41.85	43.10	44.30	45.55	46.75	47.95	49.20
16	33.40	34.60	35.85	37.05	38.30	39.50	40.75	41.95	43.15	44.40
18	29.40	30.65	31.85	33.10	34.30	35.50	36.75	37.95	39.20	40.40
20	26.10	27.30	28.55	29.75	31.00	32.20	33.40	34.65	35.85	37.10
22	23.30	24.55	25.75	27.00	28.20	29.40	30.65	31.85	33.10	34.30
24	21.00	22.20	23.40	24.65	25.85	27.10	28.30	29.55	30.75	32.00
26	19.00	20.25	21.45	22.65	23.90	25.10	26.35	27.55	28.80	30.00
28	17.35	18.55	19.80	21.00	22.20	23.45	24.65	25.90	27.10	28.35
30	16.15	17.15	18.35	19.55	20.80	22.00	23.25	24.45	25.70	26.90
35	13.90	14.90	15.90	16.90	18.00	19.25	20.45	21.70	22.90	24.15
40	12.30	13.30	14.25	15.25	16.25	17.25	18.45	19.70	20.90	22.15
45	11.05	12.05	13.00	14.00	15.00	16.00	17.00	18.15	19.35	20.60
50	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.10	19.35
55	9.15	10.15	11.10	12.10	13.10	14.10	15.10	16.10	17.10	18.25
60	8.35	9.35	10.35	11.35	12.30	13.30	14.30	15.30	16.30	17.30
65	7.60	8.60	9.60	10.60	11.60	12.55	13.55	14.55	15.55	16.55
70	6.90	7.90	8.90	9.85	10.85	11.85	12.85	13.85	14.85	15.85
75	6.20	7.20	8.20	9.20	10.15	11.15	12.15	13.15	14.15	15.15
80	5.50	6.50	7.50	8.50	9.50	10.50	11.50	12.50	13.45	14.45

1/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

2/ THE COST PER YBF GROSS VOLUME FROM THE TWO TABLES MUST BE COMBINED BEFORE THE WEIGHTED PARTIAL CUT TRACTOR YARDING COST CALCULATION IS MADE. SPECIAL NOTE MUST BE MADE OF THE ALGEBRAIC SIGN WHICH APPEARS IN THE SECOND TABLE.

3/ YARDING DISTANCE IS THE AVERAGE STRAIGHT LINE SLOPE DISTANCE FROM CHOKER SETTING POINT TO THE LANDING. DO NOT ADD A FACTOR FOR HEAVE.

4/ FOR DISTANCES EXCEEDING 1,000', ADD \$1.25 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

RIGGING, YARDING AND LOADING

9353.3 - PRODUCTION COSTS  
(Schedule 20)

RIGGING, YARDING AND LOADING

TABLE 68

YARDING AND LOADING - PARTIAL CUT TRACTOR OPERATIONS  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED AND LOADED 2/

NUMBER OF MERCHANTABLE STEMS MARKED PER ACRE 5/

PER CENT SLOPE 6/	5	6	7	8	9	10	11	12	13	14	15	16	17	18
0	-1.75	-2.10	-2.45	-2.80	-3.15	-3.45	-3.80	-4.15	-4.50	-4.85	-5.20	-5.55	-5.90	-6.25
5	-.75	-1.10	-1.45	-1.80	-2.15	-2.50	-2.85	-3.20	-3.55	-3.90	-4.25	-4.60	-4.95	-5.25
10	.20	-.15	-.50	-.80	-1.15	-1.50	-1.85	-2.20	-2.55	-2.90	-3.25	-3.60	-3.95	-4.30
15	1.20	.85	.50	.15	-.20	-.55	-.90	-1.25	-1.60	-1.95	-2.30	-2.65	-2.95	-3.30
20	2.15	1.80	1.50	1.15	.80	.45	.10	-.25	-.60	-.95	-1.30	-1.65	-2.00	-2.35
25	3.15	2.80	2.45	2.10	1.75	1.40	1.05	.70	.35	0.00	-.35	-.65	-1.00	-1.35
30	4.10	3.80	3.45	3.10	2.75	2.40	2.05	1.70	1.35	1.00	.65	.30	-.05	-.40
35	5.10	4.75	4.40	4.05	3.70	3.35	3.00	2.65	2.30	1.95	1.65	1.30	.95	.60
40	6.10	5.75	5.40	5.05	4.70	4.35	4.00	3.65	3.30	2.95	2.60	2.25	1.90	1.55
45	7.05	6.70	6.35	6.00	5.65	5.30	4.95	4.60	4.30	3.95	3.60	3.25	2.90	2.55
50	8.05	7.70	7.35	7.00	6.65	6.30	5.95	5.60	5.25	4.90	4.55	4.20	3.85	3.50
55	9.00	8.65	8.30	7.95	7.60	7.25	6.90	6.60	6.25	5.90	5.55	5.20	4.85	4.50
60	10.00	9.65	9.30	8.95	8.60	8.25	7.90	7.55	7.20	6.85	6.50	6.15	5.80	5.45

5/ MARKED STEMS - THIS IS THE NUMBER OF MERCHANTABLE STEMS MARKED PER ACRE WITHIN THE YARDING AREA.  
6/ SLOPE - THIS IS THE AVERAGE SLOPE IN PER CENT OF THE AREA BEING LOGGED AS ESTIMATED BY THE CRUISER.

BASIC DATA, APPENDIX 1, PAGES 109, 110, 113 THRU 118, 272 & 273

PARTIAL CUT YARDING - TRACTOR OPERATIONS  
WESTERN OREGON \*

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED 1/ 2/

TABLE 7A

16 FT. LOG VOLUME SCRIB. DEC.G.	100	200	300	400	500	600	700	800	900	1000
8	48.40	49.40	50.40	51.40	52.40	53.40	54.40	55.40	56.35	57.35
10	41.50	42.50	43.50	44.50	45.50	46.50	47.50	48.50	49.50	50.45
12	35.80	36.80	37.80	38.80	39.80	40.80	41.80	42.80	43.80	44.75
14	31.10	32.10	33.10	34.10	35.10	36.10	37.10	38.05	39.05	40.05
16	27.20	28.20	29.20	30.20	31.20	32.20	33.15	34.15	35.15	36.15
18	23.95	24.95	25.95	26.95	27.95	28.95	29.95	30.90	31.90	32.90
20	21.25	22.25	23.25	24.25	25.25	26.25	27.20	28.20	29.20	30.20
22	19.00	20.00	21.00	21.95	22.95	23.95	24.95	25.95	26.95	27.95
24	17.10	18.10	19.10	20.05	21.05	22.05	23.05	24.05	25.05	26.05
26	15.50	16.50	17.45	18.45	19.45	20.45	21.45	22.45	23.45	24.45
28	14.10	15.10	16.10	17.10	18.10	19.10	20.10	21.10	22.10	23.10
30	12.95	13.95	14.95	15.95	16.95	17.95	18.95	19.90	20.90	21.90
35	10.70	11.70	12.70	13.70	14.70	15.65	16.65	17.65	18.65	19.65
40	9.05	10.05	11.05	12.05	13.05	14.05	15.05	16.05	17.05	18.00
45	7.80	8.80	9.80	10.80	11.80	12.80	13.80	14.80	15.80	16.75
50	6.80	7.80	8.80	9.80	10.80	11.75	12.75	13.75	14.75	15.75
55	5.90	6.90	7.90	8.90	9.90	10.90	11.90	12.90	13.90	14.85
60	5.10	6.10	7.10	8.10	9.10	10.10	11.10	12.10	13.10	14.10
65	4.40	5.35	6.35	7.35	8.35	9.35	10.35	11.35	12.35	13.35
70	3.65	4.65	5.65	6.65	7.65	8.65	9.65	10.65	11.65	12.60
75	3.00	3.95	4.95	5.95	6.95	7.95	8.95	9.95	10.95	11.95
80	2.30	3.30	4.30	5.30	6.25	7.25	8.25	9.25	10.25	11.25

1/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

2/ THE COST PER MBF GROSS VOLUME FROM THE TWO TABLES MUST BE COMBINED BEFORE THE WEIGHTED PARTIAL CUT TRACTOR YARDING COST CALCULATION IS MADE. SPECIAL NOTE MUST BE MADE OF THE ALGEBRAIC SIGN WHICH APPEARS IN THE SECOND TABLE.

3/ YARDING DISTANCE IS THE AVERAGE STRAIGHT LINE SLOPE DISTANCE FROM CHOKER SETTING POINT TO THE LANDING. DO NOT ADD A FACTOR FOR HEAVE.

4/ FOR DISTANCES EXCEEDING 1,000', ADD \$1.00 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

\* SALVAGE PICKUP - TABULAR COSTS, INCLUDING PLUS AND MINUS FIGURES IN TABLE 7B, BY FACTOR OF 0.900.

FOR DISTANCES EXCEEDING 1000', ADD \$0.90 FOR EACH ADDITIONAL 100' OF YARDING DISTANCES.

RIGGING, YARDING AND LOADING

9353.3 - PRODUCTION COSTS  
(Schedule 20)



RIGGING, YARDING AND LOADING

TABLE 7B

PARTIAL CUT YARDING - TRACTOR OPERATIONS  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED 2/

		NUMBER OF MERCHANTABLE STEMS MARKED PER ACRE 5/															
PER CENT SLOPE 6/	5	6	7	8	9	10	11	12	13	14	15	16	17	18			
0	-1.40	-1.70	-2.00	-2.25	-2.55	-2.85	-3.10	-3.40	-3.70	-3.95	-4.25	-4.55	-4.80	-5.10			
5	-1.60	-1.90	-2.20	-2.45	-2.75	-3.05	-3.30	-3.60	-3.90	-4.15	-4.45	-4.75	-5.00	-5.30			
10	-1.20	-1.50	-1.80	-2.05	-2.35	-2.65	-2.90	-3.20	-3.50	-3.75	-4.05	-4.35	-4.60	-4.90			
15	-1.95	-2.25	-2.55	-2.80	-3.10	-3.40	-3.65	-3.95	-4.25	-4.55	-4.85	-5.15	-5.40	-5.70			
20	1.75	1.50	1.20	.90	.65	.35	.05	-.20	-.50	-.80	-1.05	-1.35	-1.65	-1.90			
25	2.55	2.30	2.00	1.70	1.45	1.15	.85	.60	.30	0.00	-.25	-.55	-.85	-1.10			
30	3.35	3.10	2.80	2.50	2.25	1.95	1.65	1.40	1.10	.80	.55	.25	-.05	-.30			
35	4.15	3.85	3.60	3.30	3.00	2.75	2.45	2.15	1.90	1.60	1.35	1.05	.75	.50			
40	4.95	4.65	4.40	4.10	3.80	3.55	3.25	2.95	2.70	2.40	2.10	1.85	1.55	1.25			
45	5.75	5.45	5.20	4.90	4.60	4.35	4.05	3.75	3.50	3.20	2.90	2.65	2.35	2.05			
50	6.55	6.25	6.00	5.70	5.40	5.15	4.85	4.55	4.30	4.00	3.70	3.45	3.15	2.85			
55	7.35	7.05	6.75	6.50	6.20	5.90	5.65	5.35	5.05	4.80	4.50	4.20	3.95	3.65			
60	8.15	7.85	7.55	7.30	7.00	6.70	6.45	6.15	5.85	5.60	5.30	5.00	4.75	4.45			

5/ MARKED STEMS - THIS IS THE NUMBER OF MERCHANTABLE STEMS MARKED PER ACRE WITHIN THE YARDING AREA.  
6/ SLOPE - THIS IS THE AVERAGE SLOPE IN PER CENT OF THE AREA BEING LOGGED AS ESTIMATED BY THE CRUISER.

BASIC DATA, APPENDIX I, PAGES 109, 110, 115, 116, 272 & 273

LOADING - PARTIAL CUT TRACTOR OPERATIONS  
WESTERN OREGON \*

COSTS IN DOLLARS PER MBF GROSS VOLUME LOADED 1/ 2/

TABLE 8A

16 FT. LOG VOLUME SCRIB. DEC.C.	YARDING DISTANCE IN FEET 3/ 4/									
	100	200	300	400	500	600	700	800	900	1000
8	11.05	11.25	11.50	11.70	11.95	12.15	12.40	12.60	12.85	13.05
10	9.45	9.70	9.90	10.15	10.35	10.60	10.80	11.05	11.25	11.50
12	8.15	8.40	8.60	8.85	9.05	9.30	9.50	9.75	10.00	10.20
14	7.10	7.30	7.55	7.75	8.00	8.20	8.45	8.70	8.90	9.15
16	6.20	6.40	6.65	6.90	7.10	7.35	7.55	7.80	8.00	8.25
18	5.45	5.70	5.90	6.15	6.35	6.60	6.80	7.05	7.25	7.50
20	4.85	5.05	5.30	5.50	5.75	6.00	6.20	6.45	6.65	6.90
22	4.35	4.55	4.80	5.00	5.25	5.45	5.70	5.90	6.15	6.35
24	3.90	4.10	4.35	4.55	4.80	5.05	5.25	5.50	5.70	5.95
26	3.55	3.75	4.00	4.20	4.45	4.65	4.90	5.10	5.35	5.55
28	3.20	3.45	3.65	3.90	4.10	4.35	4.60	4.80	5.05	5.25
30	3.20	3.20	3.40	3.65	3.85	4.10	4.30	4.55	4.75	5.00
35	3.20	3.20	3.20	3.20	3.35	3.55	3.80	4.00	4.25	4.50
40	3.20	3.20	3.20	3.20	3.20	3.20	3.45	3.65	3.90	4.10
45	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.35	3.60	3.80
50	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.35	3.60
55	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.40
60	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
65	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
70	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
75	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
80	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20

RIGGING, YARDING AND LOADING

9353.3 - PRODUCTION COSTS  
(Schedule 20)

Illustration 2, Page 11  
(.33)

1/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

2/ THE COST PER MBF GROSS VOLUME FROM THE TWO TABLES MUST BE COMBINED BEFORE THE WEIGHTED PARTIAL CUT TRACTOR YARDING COST CALCULATION IS MADE. SPECIAL NOTE MUST BE MADE OF THE ALGEBRAIC SIGN WHICH APPEARS IN THE SECOND TABLE.

3/ YARDING DISTANCE IS THE AVERAGE STRAIGHT LINE SLOPE DISTANCE FROM CHOKER SETTING POINT TO THE LANDING DO NOT ADD A FACTOR FOR WEAVE.

4/ FOR DISTANCES EXCEEDING 1,000', ADD \$0.25 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

\* SALVAGE PICKUP - TABULAR COSTS, INCLUDING PLUS AND MINUS FIGURES IN TABLE 7B, BY FACTOR OF 0.960.  
FOR DISTANCES EXCEEDING 1000', ADD \$0.20 FOR EACH ADDITIONAL 100' OF YARDING DISTANCES.

RIGGING, YARDING AND LOADING

TABLE 88

LOADING - PARTIAL CUT TRACTOR OPERATIONS  
WESTERN OREGON  
COSTS IN DOLLARS PER MBF GROSS VOLUME LOADED 2/

		NUMBER OF MERCHANTABLE STEMS MARKED PER ACRE 5/															
PER CENT SLOPE 6/	5	6	7	8	9	10	11	12	13	14	15	16	17	18			
0	-.30	-.40	-.45	-.50	-.60	-.65	-.70	-.75	-.85	-.90	-.95	-1.05	-1.10	-1.15	-1.00	-1.15	
5	-.15	-.20	-.25	-.35	-.40	-.45	-.55	-.60	-.65	-.70	-.80	-.85	-.90	-.95	-1.00	-1.05	
10	.05	0.00	-.10	-.15	-.20	-.30	-.35	-.40	-.50	-.55	-.60	-.65	-.75	-.80	-.85	-.90	
15	.20	.15	.10	.05	-.05	-.10	-.15	-.25	-.30	-.35	-.40	-.50	-.55	-.60	-.65	-.70	
20	.40	.35	.25	.20	.15	.10	0.00	-.05	-.10	-.20	-.25	-.30	-.35	-.40	-.45	-.50	
25	.60	.50	.45	.40	.35	.25	.20	.15	.05	0.00	-.05	-.10	-.20	-.25	-.30	-.35	
30	.75	.70	.65	.55	.50	.45	.40	.30	.25	.20	.10	.05	0.00	.05	.10	.15	
35	.95	.90	.80	.75	.70	.60	.55	.50	.45	.35	.30	.25	.15	.10	.05	.00	
40	1.15	1.05	1.00	.95	.85	.80	.75	.70	.60	.55	.50	.40	.35	.30	.25	.20	
45	1.30	1.25	1.20	1.10	1.05	1.00	.90	.85	.80	.75	.65	.60	.55	.50	.45	.40	
50	1.50	1.45	1.35	1.30	1.25	1.15	1.10	1.05	.95	.90	.85	.80	.70	.65	.60	.55	
55	1.65	1.60	1.55	1.50	1.40	1.35	1.30	1.20	1.15	1.10	1.05	.95	.90	.85	.80	.75	
60	1.85	1.80	1.70	1.65	1.60	1.55	1.45	1.40	1.35	1.25	1.20	1.15	1.10	1.00	.95	.90	

5/ MARKED STEMS - THIS IS THE NUMBER OF MERCHANTABLE STEMS MARKED PER ACRE WITHIN THE YARDING AREA.  
6/ SLOPE - THIS IS THE AVERAGE SLOPE IN PER CENT OF THE AREA BEING LOGGED AS ESTIMATED BY THE CRUISER.

BASIC DATA, APPENDIX 1, PAGES 113, 114, 117, 118, 272 & 273

YARDING AND LOADING - LOW GROUND PRESSURE TRACTOR OPERATIONS  
WESTERN OREGON

COSTS IN DOLLARS PER MWF GROSS VOLUME YARDED AND LOADED 1/

TABLE 9

16 FT. LOG VOLUME SCRIB. DEC.C.	YARDING DISTANCE IN FEET 2/ 3/									
	100	200	300	400	500	600	700	800	900	1000
8	36.10	36.70	37.25	37.85	38.45	39.05	39.60	40.20	40.80	41.35
10	29.90	30.45	31.05	31.65	32.20	32.80	33.40	34.00	34.55	35.15
12	24.80	25.40	25.95	26.55	27.15	27.75	28.30	28.90	29.50	30.10
14	20.65	21.25	21.85	22.40	23.00	23.60	24.15	24.75	25.35	25.95
16	17.25	17.85	18.45	19.05	19.60	20.20	20.80	21.40	21.95	22.55
18	14.50	15.10	15.70	16.30	16.85	17.45	18.05	18.65	19.20	19.80
20	12.30	12.85	13.45	14.05	14.60	15.20	15.80	16.40	16.95	17.55
22	10.45	11.05	11.65	12.20	12.80	13.40	13.95	14.55	15.15	15.75
24	9.00	9.55	10.15	10.75	11.30	11.90	12.50	13.10	13.65	14.25
26	7.80	8.35	8.95	9.55	10.10	10.70	11.30	11.90	12.45	13.05
28	7.00	7.45	8.00	8.55	9.15	9.75	10.35	10.90	11.50	12.10
30	6.35	6.80	7.30	7.80	8.40	8.95	9.55	10.15	10.70	11.30
35	5.25	5.70	6.20	6.70	7.15	7.65	8.20	8.80	9.40	10.00
40	4.65	5.10	5.60	6.10	6.55	7.05	7.55	8.05	8.65	9.25
45	4.30	4.80	5.30	5.75	6.25	6.75	7.20	7.70	8.25	8.85
50	4.20	4.65	5.15	5.65	6.10	6.60	7.10	7.55	8.10	8.70
55	4.15	4.65	5.15	5.60	6.10	6.60	7.05	7.55	8.10	8.65
60	4.20	4.70	5.20	5.65	6.15	6.65	7.10	7.60	8.15	8.75
65	4.30	4.80	5.25	5.75	6.25	6.70	7.20	7.70	8.25	8.85
70	4.40	4.90	5.35	5.85	6.35	6.80	7.30	7.80	8.40	8.95
75	4.55	5.00	5.50	6.00	6.45	6.95	7.45	7.95	8.55	9.10
80	4.65	5.15	5.65	6.10	6.60	7.10	7.55	8.10	8.70	9.30

1/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

2/ DISTANCE LOGS ACTUALLY TRAVEL FROM CHOKER SETTING POINT TO THE LANDING.

3/ FOR DISTANCES EXCEEDING 1,000', ADD \$0.60 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX 1, PAGES 111, 112, 113, 114, 270 & 271

RIGGING, YARDING AND LOADING

9353.3 - PRODUCTION COSTS  
(Schedule 20)

Illustration 2, Page 13  
(33)



## RIGGING, YARDING AND LOADING

TABLE 10

LOW GROUND PRESSURE TRACTOR YARDING  
WESTERN OREGON  
COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED 1/

16 FT. LOG VOLUME SCRIP. DEC.C.	YARDING DISTANCE IN FEET 2/ 3/									
	100	200	300	400	500	600	700	800	900	1000
8	29.70	30.20	30.70	31.15	31.65	32.15	32.60	33.10	33.60	34.05
10	24.60	25.10	25.55	26.05	26.55	27.00	27.50	27.95	28.45	28.95
12	20.40	20.90	21.40	21.85	22.35	22.85	23.30	23.80	24.30	24.75
14	17.00	17.50	17.95	18.45	18.95	19.40	19.90	20.40	20.85	21.35
16	14.20	14.70	15.20	15.65	16.15	16.65	17.10	17.60	18.10	18.55
18	11.95	12.45	12.90	13.40	13.90	14.35	14.85	15.35	15.80	16.30
20	10.10	10.60	11.05	11.55	12.05	12.50	13.00	13.50	13.95	14.45
22	8.60	9.10	9.55	10.05	10.55	11.00	11.50	12.00	12.45	12.95
24	7.40	7.85	8.35	8.85	9.30	9.80	10.30	10.75	11.25	11.75
26	6.40	6.90	7.35	7.85	8.35	8.80	9.30	9.80	10.25	10.75
28	5.60	6.10	6.55	7.05	7.55	8.00	8.50	9.00	9.45	9.95
30	4.95	5.45	5.95	6.40	6.90	7.40	7.85	8.35	8.85	9.30
35	3.85	4.35	4.85	5.30	5.80	6.30	6.75	7.25	7.75	8.20
40	3.25	3.75	4.20	4.70	5.20	5.65	6.15	6.65	7.10	7.60
45	2.95	3.45	3.90	4.40	4.90	5.35	5.85	6.35	6.80	7.30
50	2.80	3.30	3.80	4.25	4.75	5.25	5.70	6.20	6.70	7.15
55	2.80	3.30	3.75	4.25	4.75	5.20	5.70	6.15	6.65	7.15
60	2.85	3.30	3.80	4.30	4.75	5.25	5.75	6.20	6.70	7.20
65	2.90	3.40	3.90	4.35	4.85	5.35	5.80	6.30	6.80	7.25
70	3.05	3.50	4.00	4.50	4.95	5.45	5.95	6.40	6.90	7.40
75	3.15	3.65	4.10	4.60	5.10	5.55	6.05	6.55	7.00	7.50
80	3.30	3.75	4.25	4.75	5.20	5.70	6.20	6.65	7.15	7.65

1/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

2/ DISTANCE LOGS ACTUALLY TRAVEL FROM CHOKER SETTING POINT TO THE LANDING.

3/ FOR DISTANCES EXCEEDING 1,000', ADD \$0.50 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX I, PAGES III, III, 270 &amp; 271

RIGGING, YARDING AND LOADING

TABLE 11

LOADING - LOW GROUND PRESSURE TRACTOR OPERATIONS  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME LOADED 1/

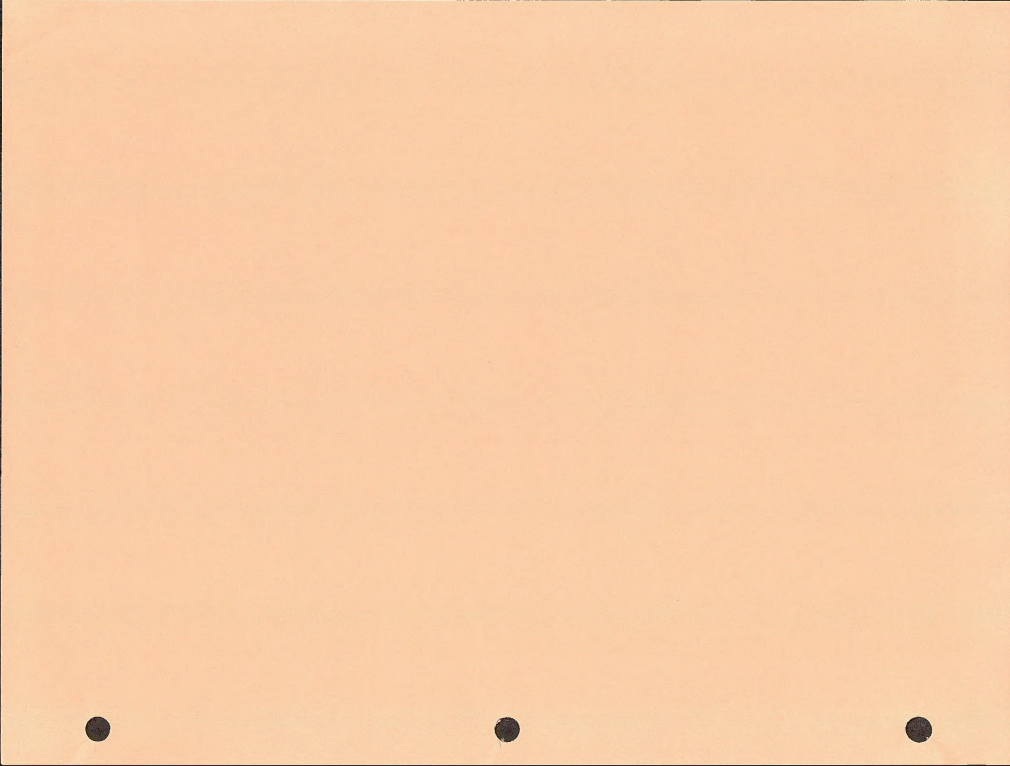
16 FT. LOG VOLUME SCRIB. DEC.C.	YARDING DISTANCE IN FEET 2/ 3/									
	100	200	300	400	500	600	700	800	900	1000
8	6.40	6.50	6.60	6.70	6.80	6.90	7.00	7.10	7.20	7.30
10	5.30	5.40	5.50	5.60	5.70	5.80	5.90	6.00	6.10	6.20
12	4.40	4.50	4.60	4.70	4.80	4.90	5.00	5.10	5.20	5.30
14	3.65	3.75	3.85	3.95	4.05	4.15	4.25	4.40	4.50	4.60
16	3.05	3.15	3.25	3.35	3.45	3.55	3.70	3.80	3.90	4.00
18	2.55	2.65	2.75	2.90	3.00	3.10	3.20	3.30	3.40	3.50
20	2.15	2.25	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
22	1.85	1.95	2.05	2.15	2.25	2.35	2.45	2.55	2.70	2.80
24	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50
26	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30
28	1.40	1.40	1.40	1.50	1.60	1.70	1.85	1.95	2.05	2.15
30	1.40	1.40	1.40	1.40	1.50	1.60	1.70	1.80	1.90	2.00
35	1.40	1.40	1.40	1.40	1.40	1.40	1.45	1.55	1.65	1.75
40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.45	1.55	1.65
45	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.45	1.55
50	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.45	1.55
55	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.45	1.55
60	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.45	1.55
65	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.45	1.55
70	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.50	1.60
75	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.50	1.60
80	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.45	1.55	1.65

1/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

2/ DISTANCE LOGS ACTUALLY TRAVEL FROM CHOKER SETTING POINT TO THE LANDING.

3/ FOR DISTANCES EXCEEDING 1,000', ADD \$0.10 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX 1, PAGES 113, 114, 270 &amp; 271



RIGGING, YARDING AND LOADING

TABLE 13

PARTIAL CUT YARDING AND LOADING - LOW GROUND PRESSURE TRACTOR OPERATIONS  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED AND LOADED 2/

		NUMBER OF MERCHANTABLE STEMS MARKED PER ACRE 5/													
PER CENT SLOPE 6/		5	6	7	8	9	10	11	12	13	14	15	16	17	18
0	-1.50	-1.80	-2.10	-2.40	-2.70	-3.05	-3.35	-3.65	-3.95	-4.25	-4.55	-4.85	-5.15	-5.45	-5.75
5	-1.65	-1.95	-2.25	-2.55	-2.85	-3.15	-3.45	-3.75	-4.05	-4.35	-4.65	-4.95	-5.25	-5.55	-5.85
10	-1.80	-2.10	-2.40	-2.70	-3.00	-3.30	-3.60	-3.90	-4.20	-4.50	-4.80	-5.10	-5.40	-5.70	-6.00
15	-1.95	-2.25	-2.55	-2.85	-3.15	-3.45	-3.75	-4.05	-4.35	-4.65	-4.95	-5.25	-5.55	-5.85	-6.15
20	-2.10	-2.40	-2.70	-3.00	-3.30	-3.60	-3.90	-4.20	-4.50	-4.80	-5.10	-5.40	-5.70	-6.00	-6.30
25	-2.25	-2.55	-2.85	-3.15	-3.45	-3.75	-4.05	-4.35	-4.65	-4.95	-5.25	-5.55	-5.85	-6.15	-6.45
30	-2.40	-2.70	-3.00	-3.30	-3.60	-3.90	-4.20	-4.50	-4.80	-5.10	-5.40	-5.70	-6.00	-6.30	-6.60
35	-2.55	-2.85	-3.15	-3.45	-3.75	-4.05	-4.35	-4.65	-4.95	-5.25	-5.55	-5.85	-6.15	-6.45	-6.75
40	-2.70	-3.00	-3.30	-3.60	-3.90	-4.20	-4.50	-4.80	-5.10	-5.40	-5.70	-6.00	-6.30	-6.60	-6.90
45	-2.85	-3.15	-3.45	-3.75	-4.05	-4.35	-4.65	-4.95	-5.25	-5.55	-5.85	-6.15	-6.45	-6.75	-7.05
50	-3.00	-3.30	-3.60	-3.90	-4.20	-4.50	-4.80	-5.10	-5.40	-5.70	-6.00	-6.30	-6.60	-6.90	-7.20
55	-3.15	-3.45	-3.75	-4.05	-4.35	-4.65	-4.95	-5.25	-5.55	-5.85	-6.15	-6.45	-6.75	-7.05	-7.35
60	-3.30	-3.60	-3.90	-4.20	-4.50	-4.80	-5.10	-5.40	-5.70	-6.00	-6.30	-6.60	-6.90	-7.20	-7.50

5/ MARKED STEMS - THIS IS THE NUMBER OF MERCHANTABLE STEMS MARKED PER ACRE WITHIN THE YARDING AREA.  
6/ SLOPE - THIS IS THE AVERAGE SLOPE IN PER CENT OF THE AREA BEING LOGGED AS ESTIMATED BY THE CRUISER.

BASIC DATA, APPENDIX 1, PAGES 111 THRU 114, 272 & 273



TABLE 14

PARTIAL CUT YARDING - LOW GROUND PRESSURE TRACTOR OPERATIONS  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED 1/ 2/

16 FT. LOG VOLUME SCRIB. DEC.C.	YARDING DISTANCE IN FEET 3/ 4/									
	100	200	300	400	500	600	700	800	900	1000
8	42.65	43.50	44.40	45.25	46.15	47.00	47.90	48.75	49.65	50.50
10	36.55	37.45	38.30	39.20	40.05	40.95	41.80	42.70	43.55	44.45
12	31.55	32.40	33.30	34.15	35.05	35.90	36.80	37.65	38.55	39.45
14	27.40	28.25	29.15	30.00	30.90	31.75	32.65	33.50	34.40	35.30
16	23.95	24.85	25.70	26.60	27.45	28.35	29.20	30.10	30.95	31.85
18	21.10	21.95	22.85	23.70	24.60	25.45	26.35	27.25	28.10	29.00
20	18.70	19.60	20.45	21.35	22.20	23.10	23.95	24.85	25.70	26.60
22	16.70	17.60	18.45	19.35	20.20	21.10	22.00	22.85	23.75	24.60
24	15.05	15.90	16.80	17.65	18.55	19.45	20.30	21.20	22.05	22.95
26	13.65	14.50	15.40	16.25	17.15	18.00	18.90	19.75	20.65	21.50
28	12.45	13.30	14.20	15.05	15.95	16.80	17.70	18.55	19.45	20.30
30	11.40	12.30	13.15	14.05	14.90	15.80	16.65	17.55	18.40	19.30
35	9.40	10.30	11.15	12.05	12.90	13.80	14.70	15.55	16.45	17.30
40	8.00	8.85	9.75	10.60	11.50	12.35	13.25	14.10	15.00	15.85
45	6.90	7.75	8.65	9.50	10.40	11.25	12.15	13.00	13.90	14.75
50	6.00	6.85	7.75	8.60	9.50	10.35	11.25	12.10	13.00	13.85
55	5.20	6.10	6.95	7.85	8.70	9.60	10.45	11.35	12.20	13.10
60	4.50	5.40	6.25	7.15	8.00	8.90	9.75	10.65	11.50	12.40
65	3.85	4.75	5.60	6.50	7.35	8.25	9.10	10.00	10.85	11.75
70	3.25	4.10	5.00	5.85	6.75	7.60	8.50	9.35	10.25	11.10
75	2.60	3.50	4.35	5.25	6.15	7.00	7.90	8.75	9.65	10.50
80	2.00	2.90	3.75	4.65	5.55	6.40	7.30	8.15	9.05	9.90

1/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

2/ THE COST PER MBF GROSS VOLUME FROM THE TWO TABLES MUST BE COMBINED BEFORE THE WEIGHTED PARTIAL CUT TRACTOR YARDING COST CALCULATION IS MADE. SPECIAL NOTE MUST BE MADE OF THE ALGEBRAIC SIGN WHICH APPEARS IN THE SECOND TABLE.

3/ YARDING DISTANCE IS THE AVERAGE STRAIGHT LINE SLOPE DISTANCE FROM CHOKER SETTING POINT TO THE LANDING. DO NOT ADD A FACTOR FOR WEAVE.

4/ FOR DISTANCES EXCEEDING 1,000', ADD \$0.90 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

TABLE 15

PARTIAL CUT YARDING - LOW GROUND PRESSURE TRACTOR OPERATIONS  
WESTERN OREGON

COSTS IN DOLLARS PER M9F GROSS VOLUME YARDED 2/

PER CENT SLOPE 6/	NUMBER OF MERCHANTABLE STEMS MARKED PER ACRE 5/																	
	5	6	7	8	9	10	11	12	13	14	15	16	17	18				
0	-1.25	-1.50	-1.75	-2.00	-2.25	-2.50	-2.75	-3.00	-3.25	-3.50	-3.75	-4.00	-4.25	-4.50				
5	-.55	-.80	-1.05	-1.30	-1.55	-1.80	-2.05	-2.30	-2.55	-2.80	-3.05	-3.30	-3.55	-3.80				
10	.15	-.10	-.35	-.60	-.85	-1.10	-1.35	-1.60	-1.85	-2.10	-2.35	-2.60	-2.85	-3.10				
15	.85	.60	.35	.10	-.15	-.40	-.65	-.90	-1.15	-1.40	-1.65	-1.90	-2.15	-2.40				
20	1.55	1.30	1.05	.80	.55	.30	.05	-.20	-.45	-.70	-.95	-1.20	-1.45	-1.70				
25	2.25	2.00	1.75	1.50	1.25	1.00	.75	.50	.25	0.00	-.25	-.50	-.75	-1.00				
30	2.95	2.70	2.45	2.20	1.95	1.70	1.45	1.20	.95	.70	.45	.20	-.05	-.30				
35	3.65	3.40	3.15	2.90	2.65	2.40	2.15	1.90	1.65	1.40	1.15	.90	.65	.40				
40	4.35	4.10	3.85	3.60	3.35	3.10	2.85	2.60	2.35	2.10	1.85	1.60	1.35	1.10				
45	5.05	4.80	4.55	4.30	4.05	3.80	3.55	3.30	3.05	2.80	2.55	2.30	2.05	1.80				
50	5.75	5.50	5.25	5.00	4.75	4.50	4.25	4.00	3.75	3.50	3.25	3.00	2.75	2.50				
55	6.45	6.20	5.95	5.70	5.45	5.20	4.95	4.70	4.45	4.20	3.95	3.70	3.45	3.20				
60	7.15	6.90	6.65	6.40	6.15	5.90	5.65	5.40	5.15	4.90	4.65	4.40	4.15	3.90				

5/ MARKED STEMS - THIS IS THE NUMBER OF MERCHANTABLE STEMS MARKED PER ACRE WITHIN THE YARDING AREA.  
6/ SLOPE - THIS IS THE AVERAGE SLOPE IN PER CENT OF THE AREA BEING LOGGED AS ESTIMATED BY THE CRUISER.

BASIC DATA, APPENDIX 1, PAGES 111, 112, 272 & 273

RIGGING, YARDING AND LOADING

9353.3 - PRODUCTION COSTS  
(Schedule 20)

TABLE 16

PARTIAL CUT LOADING - LOW GROUND PRESSURE TRACTOR OPERATIONS  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME LOADED 1/ 2/

16 FT. LOG VOLUME SERIES DEC.C.	YARDING DISTANCE IN FEET 3/ 4/									
	100	200	300	400	500	600	700	800	900	1000
8	9.15	9.35	9.55	9.70	9.90	10.10	10.30	10.45	10.65	10.85
10	7.85	8.05	8.25	8.40	8.60	8.80	9.00	9.15	9.35	9.55
12	6.75	6.95	7.15	7.35	7.55	7.70	7.90	8.10	8.30	8.45
14	5.90	6.05	6.25	6.45	6.65	6.80	7.00	7.20	7.40	7.60
16	5.15	5.35	5.50	5.70	5.90	6.10	6.25	6.45	6.65	6.85
18	4.55	4.70	4.90	5.10	5.30	5.45	5.65	5.85	6.05	6.20
20	4.00	4.20	4.40	4.60	4.75	4.95	5.15	5.35	5.50	5.70
22	3.60	3.80	3.95	4.15	4.35	4.55	4.70	4.90	5.10	5.30
24	3.25	3.40	3.60	3.80	4.00	4.15	4.35	4.55	4.75	4.95
26	3.20	3.20	3.30	3.50	3.70	3.85	4.05	4.25	4.45	4.60
28	2.65	2.85	3.05	3.25	3.40	3.60	3.80	4.00	4.20	4.35
30	2.65	2.65	2.85	3.00	3.20	3.40	3.60	3.75	3.95	4.15
35	2.65	2.65	2.65	2.65	2.80	2.95	3.15	3.35	3.55	3.70
40	2.65	2.65	2.65	2.65	2.65	2.65	2.85	3.05	3.20	3.40
45	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.80	3.00	3.15
50	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.80	3.00
55	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.80
60	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65
65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65
70	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65
75	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65
80	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65

1/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

2/ THE COST PER MBF GROSS VOLUME FROM THE TWO TABLES MUST BE COMBINED BEFORE THE WEIGHTED PARTIAL CUT TRACTOR YARDING COST CALCULATION IS MADE. SPECIAL NOTE MUST BE MADE OF THE ALGEBRAIC SIGN WHICH APPEARS IN THE SECOND TABLE.

3/ YARDING DISTANCE IS THE AVERAGE STRAIGHT LINE SLOPE DISTANCE FROM CHOKER SETTING POINT TO THE LANDING. DO NOT ADD A FACTOR FOR HEAVE.

4/ FOR DISTANCES EXCEEDING 1,000', ADD \$6.20 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

TABLE 17

PARTIAL CUT LOADING - LOW GROUND PRESSURE TRACTOR OPERATIONS  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME LOADED 2/

NUMBER OF MERCHANTABLE STEMS MARKED PER ACRE 5/

PER CENT SLOPE 6/	5	6	7	8	9	10	11	12	13	14	15	16	17	18
0	-.25	-.30	-.35	-.45	-.50	-.55	-.60	-.65	-.70	-.75	-.80	-.85	-.90	-.95
5	-.10	-.15	-.20	-.30	-.35	-.40	-.45	-.50	-.55	-.60	-.65	-.70	-.75	-.80
10	.05	0.00	-.05	-.15	-.20	-.25	-.30	-.35	-.40	-.45	-.50	-.55	-.60	-.65
15	.20	.15	.10	0.00	-.05	-.10	-.15	-.20	-.25	-.30	-.35	-.40	-.45	-.50
20	.35	.30	.25	.15	.10	.05	0.00	-.05	-.10	-.15	-.20	-.25	-.30	-.35
25	.50	.45	.40	.30	.25	.20	.15	.10	.05	0.00	-.05	-.10	-.15	-.20
30	.65	.60	.55	.45	.40	.35	.30	.25	.20	.15	.10	.05	0.00	-.05
35	.80	.75	.70	.65	.55	.50	.45	.40	.35	.30	.25	.20	.15	.10
40	.95	.90	.85	.80	.70	.65	.60	.55	.50	.45	.40	.35	.30	.25
45	1.10	1.05	1.00	.95	.85	.80	.75	.70	.65	.60	.55	.50	.45	.40
50	1.25	1.20	1.15	1.10	1.00	.95	.90	.85	.80	.75	.70	.65	.60	.55
55	1.40	1.35	1.30	1.25	1.15	1.10	1.05	1.00	.95	.90	.85	.80	.75	.70
60	1.55	1.50	1.45	1.40	1.30	1.25	1.20	1.15	1.10	1.05	1.00	.95	.90	.85

5/ MARKED STEMS - THIS IS THE NUMBER OF MERCHANTABLE STEMS MARKED PER ACRE WITHIN THE YARDING AREA.  
6/ SLOPE - THIS IS THE AVERAGE SLOPE IN PER CENT OF THE AREA BEING LOGGED AS ESTIMATED BY THE CRUISER.

BASIC DATA, APPENDIX 1, PAGES 113, 114, 272 & 273

RIGGING, YARDING AND LOADING

9351.3 - PRODUCTION COSTS  
(Schedule 20)



9353.3 - PRODUCTION COSTS  
 (Schedule 20)  
RIGGING, YARDING AND LOADING

TABLE 18

TRACTOR RIGGING - WESTERN OREGON  
 (Includes Use For Low Ground Pressure Tractor)  
CLEAR CUT AND PARTIAL CUT

Includes: 2 yarding tractors  
 Large mobile log loader  
 6 man yarding & loading crew

First Landing \$345

1/ Additional Landing \$110 (each)

WESTERN OREGON - FOR SALVAGE PICKUP

Includes: 1 yarding tractor  
 1 front end loader  
 3 man yarding and loading crew

First Landing \$300

1/ Additional Landings \$110 (each)

1/ If landings are more than 1/2 mile apart, allow \$55 for each additional 1/4 mile.

Move-in costs not included. See Table 1 for appropriate move-in costs. These rigging costs are suggested as guidelines. The appraiser should judge each logging situation individually and develop appropriate rigging costs.

Basic Data, Appendix 1, Pages 119 thru 126

# YARDING AND LOADING - TRACTOR OPERATIONS EASTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED AND LOADED 1/

16 FT. LOG VOLUME SC18. DEC.C.	YARDING DISTANCE IN FEET 2/ 3/									
	100	200	300	400	500	600	700	800	900	1000
4	25.75	26.35	26.95	27.53	28.10	28.70	29.25	29.85	30.40	31.00
6	24.45	25.05	25.60	26.20	26.80	27.35	27.95	28.50	29.10	29.70
8	23.15	23.75	24.35	24.90	25.50	26.05	26.65	27.25	27.80	28.40
10	21.90	22.50	23.10	23.65	24.25	24.80	25.40	26.00	26.55	27.15
12	20.70	21.30	21.85	22.45	23.00	23.60	24.20	24.75	25.35	25.95
14	19.50	20.10	20.65	21.25	21.85	22.40	23.00	23.60	24.15	24.75
16	18.35	18.95	19.50	20.10	20.70	21.25	21.85	22.40	23.00	23.60
18	17.25	17.80	18.40	19.00	19.55	20.15	20.70	21.30	21.90	22.45
20	16.15	16.75	17.30	17.90	18.45	19.05	19.65	20.20	20.80	21.40
22	15.10	15.65	16.25	16.85	17.40	18.00	18.60	19.15	19.75	20.30
24	14.05	14.65	15.25	15.80	16.40	16.95	17.55	18.15	18.70	19.30
26	13.10	13.65	14.25	14.80	15.40	16.00	16.55	17.15	17.75	18.30
28	12.10	12.70	13.30	13.85	14.45	15.00	15.60	16.20	16.75	17.35
30	11.20	11.75	12.35	12.95	13.50	14.10	14.70	15.25	15.85	16.40
32	10.30	10.90	11.45	12.05	12.65	13.20	13.80	14.35	14.95	15.55
34	9.45	10.00	10.60	11.20	11.75	12.35	12.95	13.50	14.10	14.65
36	8.60	9.20	9.80	10.35	10.95	11.50	12.10	12.70	13.25	13.85
38	7.80	8.40	9.00	9.55	10.15	10.75	11.30	11.90	12.45	13.05
40	7.05	7.65	8.20	8.80	9.40	9.95	10.55	11.15	11.70	12.30
42	6.35	6.90	7.50	8.10	8.65	9.25	9.80	10.40	11.00	11.55

1/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

2/ DISTANCE LOGS ACTUALLY TRAVEL FROM CHOKER SETTING POINT TO THE LANDING.

3/ FOR DISTANCES EXCEEDING 1,000', ADD \$0.60 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX 1, PAGES 127, 128, 131, 132 & 274

TABLE 19

RIGGING, YARDING AND LOADING

9353.3 - PRODUCTION COSTS  
(Schedule 20)

Illustration 2, Page 23  
(.33)

RIGGING, YARDING AND LOADING

TABLE 20

TRACTOR YARDING  
EASTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED 1/

16 FT. LOG VOLUME SCRIB. O.E.C.C.	YARDING DISTANCE IN FEET 2/ 3/									
	100	200	300	400	500	600	700	800	900	1000
4	20.55	21.00	21.50	21.95	22.40	22.90	23.35	23.80	24.25	24.75
6	19.50	19.95	20.45	20.90	21.35	21.85	22.30	22.75	23.20	23.70
8	18.50	18.95	19.40	19.90	20.35	20.80	21.25	21.75	22.20	22.65
10	17.50	17.95	18.40	18.90	19.35	19.80	20.25	20.75	21.20	21.65
12	16.50	17.00	17.45	17.90	18.35	18.85	19.30	19.75	20.20	20.70
14	15.55	16.05	16.50	16.95	17.40	17.90	18.35	18.80	19.30	19.75
16	14.65	15.10	15.55	16.05	16.50	16.95	17.45	17.90	18.35	18.80
18	13.75	14.20	14.70	15.15	15.60	16.05	16.55	17.00	17.45	17.90
20	12.90	13.35	13.80	14.25	14.75	15.20	15.65	16.15	16.60	17.05
22	12.05	12.50	12.95	13.45	13.90	14.35	14.80	15.30	15.75	16.20
24	11.20	11.70	12.15	12.60	13.10	13.55	14.00	14.45	14.95	15.40
26	10.45	10.90	11.35	11.80	12.30	12.75	13.20	13.70	14.15	14.60
28	9.65	10.15	10.60	11.05	11.50	12.00	12.45	12.90	13.40	13.85
30	8.95	9.40	9.85	10.30	10.80	11.25	11.70	12.20	12.65	13.10
32	8.20	8.70	9.15	9.60	10.05	10.55	11.00	11.45	11.95	12.40
34	7.55	8.00	8.45	8.95	9.40	9.85	10.30	10.80	11.25	11.70
36	6.85	7.35	7.80	8.25	8.75	9.20	9.65	10.10	10.60	11.05
38	6.25	6.70	7.15	7.65	8.10	8.55	9.00	9.50	9.95	10.40
40	5.65	6.10	6.55	7.05	7.50	7.95	8.40	8.90	9.35	9.80
42	5.05	5.50	6.00	6.45	6.90	7.35	7.85	8.30	8.75	9.25

1/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

2/ DISTANCE LOGS ACTUALLY TRAVEL FROM CHOKER SETTING POINT TO THE LANDING.

3/ FOR DISTANCES EXCEEDING 1,000', ADD \$0.45 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX I, PAGES 127, 128, & 274

9353.3 - PRODUCTION COSTS  
(Schedule 20)

RIGGING, YARDING AND LOADING

TABLE 21

LOADING - TRACTOR OPERATIONS  
EASTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME LOADED 1/ 2/

16 FT. LOG VOLUME SCRIB. DEC.C.	YARDING DISTANCE IN FEET 3/ 4/									
	100	200	300	400	500	600	700	800	900	1000
4	5.20	5.35	5.45	5.55	5.70	5.80	5.90	6.05	6.15	6.25
6	4.95	5.05	5.20	5.30	5.40	5.55	5.65	5.75	5.90	6.00
8	4.70	4.80	4.90	5.05	5.15	5.25	5.40	5.50	5.60	5.75
10	4.45	4.55	4.65	4.80	4.90	5.00	5.15	5.25	5.35	5.50
12	4.20	4.30	4.40	4.55	4.65	4.75	4.90	5.00	5.10	5.25
14	3.95	4.05	4.20	4.30	4.40	4.55	4.65	4.75	4.90	5.00
16	3.70	3.85	3.95	4.05	4.20	4.30	4.40	4.55	4.65	4.75
18	3.50	3.60	3.70	3.85	3.95	4.05	4.20	4.30	4.40	4.55
20	3.25	3.40	3.50	3.60	3.75	3.85	3.95	4.10	4.20	4.30
22	3.05	3.15	3.30	3.40	3.50	3.65	3.75	3.85	4.00	4.10
24	2.85	2.95	3.10	3.20	3.30	3.45	3.55	3.65	3.80	3.90
26	2.65	2.75	2.90	3.00	3.10	3.25	3.35	3.45	3.60	3.70
28	2.45	2.55	2.70	2.80	2.90	3.05	3.15	3.25	3.40	3.50
30	2.25	2.40	2.50	2.60	2.75	2.85	2.95	3.10	3.20	3.30
32	2.10	2.20	2.30	2.45	2.55	2.65	2.80	2.90	3.00	3.15
34	1.90	2.05	2.15	2.25	2.40	2.50	2.60	2.75	2.85	2.95
36	1.75	1.85	2.00	2.10	2.20	2.35	2.45	2.55	2.70	2.80
38	1.60	1.70	1.80	1.95	2.05	2.15	2.30	2.40	2.50	2.65
40	1.45	1.55	1.65	1.80	1.90	2.00	2.15	2.25	2.35	2.50
42	1.30	1.40	1.50	1.65	1.75	1.85	2.00	2.10	2.20	2.35

1/ THESE COSTS APPLY WHERE LOADING PRODUCTION IS LIMITED BY YARDING PRODUCTION.  
2/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

3/ DISTANCE LOGS ACTUALLY TRAVEL FROM CHOKER SETTING POINT TO THE LANDING.

4/ FOR DISTANCES EXCEEDING 1,000', ADD \$0.10 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX 1, PAGES 131, 132 & 274



TABLE 22

YARDING AND LOADING - LOW GROUND PRESSURE TRACTOR OPERATIONS  
EASTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED AND LOADED 1/

16 FT. LOG VOLUME SCRIB. DEC.G.	100	200	300	400	500	600	700	800	900	1000
4	22.70	23.20	23.75	24.25	24.75	25.25	25.75	26.30	26.80	27.30
6	21.55	22.05	22.55	23.10	23.60	24.10	24.60	25.10	25.65	26.15
8	20.40	20.90	21.45	21.95	22.45	22.95	23.50	24.00	24.50	25.00
10	19.30	19.80	20.35	20.85	21.35	21.85	22.40	22.90	23.40	23.90
12	18.25	18.75	19.25	19.75	20.30	20.80	21.30	21.80	22.35	22.85
14	17.20	17.70	18.20	18.70	19.25	19.75	20.25	20.75	21.30	21.80
16	16.15	16.70	17.20	17.70	18.20	18.75	19.25	19.75	20.25	20.80
18	15.20	15.70	16.20	16.70	17.25	17.75	18.25	18.75	19.30	19.80
20	14.20	14.75	15.25	15.75	16.25	16.80	17.30	17.80	18.30	18.85
22	13.30	13.80	14.30	14.85	15.35	15.85	16.35	16.90	17.40	17.90
24	12.40	12.90	13.40	13.95	14.45	14.95	15.45	15.95	16.50	17.00
26	11.50	12.05	12.55	13.05	13.55	14.10	14.60	15.10	15.60	16.15
28	10.70	11.20	11.70	12.20	12.70	13.25	13.75	14.25	14.75	15.30
30	9.85	10.35	10.90	11.40	11.90	12.40	12.95	13.45	13.95	14.45
32	9.05	9.60	10.10	10.60	11.10	11.65	12.15	12.65	13.15	13.70
34	8.30	8.85	9.35	9.85	10.35	10.90	11.40	11.90	12.40	12.95
36	7.60	8.10	8.60	9.15	9.65	10.15	10.65	11.15	11.70	12.20
38	6.90	7.40	7.90	8.45	8.95	9.45	9.95	10.45	11.00	11.50
40	6.20	6.75	7.25	7.75	8.25	8.80	9.30	9.80	10.30	10.85
42	5.60	6.10	6.60	7.10	7.65	8.15	8.65	9.15	9.70	10.20

1/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

2/ DISTANCE LOGS ACTUALLY TRAVEL FROM CHOKER SETTING POINT TO THE LANDING.

3/ FOR DISTANCES EXCEEDING 1,000', ADD \$0.55 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX I, PAGES 129 THRU 132 & 274

LOW GROUND PRESSURE TRACTOR YARDING  
EASTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED 1/

TABLE 23

16 FT. LOG VOLUME SCRIBED DEC.C.	YARDING DISTANCE IN FEET 2/ 3/									
	100	200	300	400	500	600	700	800	900	1000
4	18.35	18.75	19.15	19.55	20.00	20.40	20.80	21.25	21.65	22.05
6	17.40	17.80	18.20	18.65	19.05	19.45	19.85	20.30	20.70	21.10
8	16.50	16.90	17.30	17.70	18.15	18.55	18.95	19.35	19.80	20.20
10	15.60	16.00	16.40	16.85	17.25	17.65	18.05	18.50	18.90	19.30
12	14.70	15.15	15.55	15.95	16.40	16.80	17.20	17.60	18.05	18.45
14	13.90	14.30	14.70	15.10	15.55	15.95	16.35	16.75	17.20	17.60
16	13.05	13.45	13.90	14.30	14.70	15.10	15.55	15.95	16.35	16.80
18	12.25	12.65	13.10	13.50	13.90	14.35	14.75	15.15	15.55	16.00
20	11.50	11.90	12.30	12.70	13.15	13.55	13.95	14.40	14.80	15.20
22	10.75	11.15	11.55	11.95	12.40	12.80	13.20	13.65	14.05	14.45
24	10.00	10.40	10.85	11.25	11.65	12.05	12.50	12.90	13.30	13.75
26	9.30	9.70	10.15	10.55	10.95	11.35	11.80	12.20	12.60	13.00
28	8.60	9.05	9.45	9.85	10.25	10.70	11.10	11.50	11.95	12.35
30	7.95	8.40	8.80	9.20	9.60	10.05	10.45	10.85	11.25	11.70
32	7.35	7.75	8.15	8.55	9.00	9.40	9.80	10.20	10.65	11.05
34	6.70	7.15	7.55	7.95	8.35	8.80	9.20	9.60	10.00	10.45
36	6.15	6.55	6.95	7.35	7.80	8.20	8.60	9.00	9.45	9.85
38	5.55	6.00	6.40	6.80	7.20	7.65	8.05	8.45	8.85	9.30
40	5.00	5.45	5.85	6.25	6.70	7.10	7.50	7.90	8.35	8.75
42	4.50	4.90	5.35	5.75	6.15	6.55	7.00	7.40	7.80	8.25

1/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

2/ DISTANCE LOGS ACTUALLY TRAVEL FROM CHOKER SETTING POINT TO THE LANDING.

3/ FOR DISTANCES EXCEEDING 1,000', ADD \$0.45 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX 1, PAGES 129, 130 & 274

RIGGING, YARDING AND LOADING

9353.3 - PRODUCTION COSTS  
(Schedule 20)

RIGGING, YARDING AND LOADING

TABLE 24

LOADING - LOW GROUND PRESSURE TRACTOR OPERATIONS  
EASTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME LOADED 1/ 2/

16 FT. LOG VOLUME SCRIB. DEC.C.	100	200	300	400	500	600	700	800	900	1000
4	4.35	4.45	4.55	4.65	4.75	4.85	4.95	5.05	5.15	5.25
6	4.15	4.25	4.35	4.45	4.55	4.65	4.75	4.85	4.95	5.05
8	3.95	4.05	4.15	4.20	4.30	4.40	4.50	4.60	4.70	4.80
10	3.70	3.80	3.90	4.00	4.10	4.20	4.30	4.40	4.50	4.60
12	3.50	3.60	3.70	3.80	3.90	4.00	4.10	4.20	4.30	4.40
14	3.30	3.40	3.50	3.60	3.70	3.80	3.90	4.00	4.10	4.20
16	3.10	3.20	3.30	3.40	3.50	3.60	3.70	3.80	3.90	4.00
18	2.90	3.00	3.10	3.20	3.30	3.40	3.50	3.60	3.70	3.80
20	2.75	2.85	2.95	3.05	3.15	3.25	3.35	3.45	3.55	3.60
22	2.55	2.65	2.75	2.85	2.95	3.05	3.15	3.25	3.35	3.45
24	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10	3.15	3.25
26	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
28	2.05	2.15	2.25	2.35	2.45	2.55	2.65	2.75	2.85	2.95
30	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80
32	1.75	1.85	1.95	2.05	2.15	2.25	2.35	2.45	2.55	2.65
34	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50
36	1.45	1.55	1.65	1.75	1.85	1.95	2.05	2.15	2.25	2.35
38	1.35	1.45	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20
40	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10
42	1.05	1.15	1.25	1.35	1.45	1.55	1.65	1.75	1.85	1.95

1/ THESE COSTS APPLY WHERE LOADING PRODUCTION IS LIMITED BY YARDING PRODUCTION.

2/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

3/ DISTANCE LOGS ACTUALLY TRAVEL FROM CHOKER SETTING POINT TO THE LANDING.

4/ FOR DISTANCES EXCEEDING 1,000', ADD \$0.10 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX I, PAGES 131, 132 & 274

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
RIGGING, YARDING AND LOADING

TABLE 25

TRACTOR RIGGING - EASTERN OREGON

Includes: 2 yarding tractors  
Large mobile log loader  
6 man yarding & loading crew

	First Landing	\$325
	<u>1/</u> Additional Landings	\$80 (each)
<u>1/</u>	If landings are more than 1/2 mile apart, allow \$35 for each additional 1/4 mile.	

Move-in costs not included. See Table 2 for appropriate move-in costs. These rigging costs are suggested as guidelines. The appraiser should judge each logging situation individually and develop appropriate rigging cost.

Basic Data, Appendix 1, Pages 133 thru 136



## RIGGING, YARDING AND LOADING

TABLE 26

YARDING AND LOADING - HIGH-LEAD OPERATIONS - WASHINGTON 78A  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED AND LOADED 1/ 2/

16 FT. LOG VOLUME SCRIB. DEC.C.	100	200	300	400	500	600	700	800	900	1000
0	55.75	57.65	59.60	61.50	63.40	65.30	67.20	69.10	71.00	72.95
10	41.75	43.65	45.55	47.50	49.40	51.30	53.20	55.10	57.00	58.90
12	32.35	34.25	36.15	38.10	40.00	41.90	43.80	45.70	47.60	49.50
14	26.05	27.95	29.85	31.75	33.65	35.50	37.50	39.40	41.30	43.20
16	21.80	23.70	25.60	27.55	29.45	31.35	33.25	35.15	37.05	38.95
18	18.95	20.85	22.75	24.70	26.60	28.50	30.40	32.30	34.20	36.10
20	17.05	18.95	20.85	22.75	24.65	26.55	28.50	30.40	32.30	34.20
22	15.75	17.65	19.55	21.45	23.35	25.25	27.20	29.10	31.00	32.90
24	14.95	16.75	18.65	20.60	22.50	24.40	26.30	28.20	30.10	32.00
26	14.25	16.15	18.05	20.00	21.90	23.80	25.70	27.60	29.50	31.40
28	13.85	15.75	17.65	19.55	21.45	23.40	25.30	27.20	29.10	31.00
30	13.55	15.45	17.40	19.30	21.20	23.10	25.00	26.90	28.80	30.70
35	13.15	15.05	16.95	18.90	20.80	22.70	24.60	26.50	28.40	30.30
40	12.95	14.85	16.80	18.70	20.60	22.50	24.40	26.30	28.20	30.15
45	12.85	14.75	16.65	18.55	20.45	22.40	24.30	26.20	28.10	30.00
50	12.75	14.65	16.55	18.50	20.40	22.30	24.20	26.10	28.00	29.90
55	12.70	14.60	16.50	18.40	20.30	22.20	24.10	26.05	27.95	29.85
60	12.60	14.50	16.40	18.30	20.25	22.15	24.05	25.95	27.85	29.75
65	12.55	14.45	16.35	18.25	20.15	22.05	23.95	25.90	27.80	29.70
70	12.45	14.35	16.25	18.20	20.10	22.00	23.90	25.80	27.70	29.60
75	12.40	14.30	16.20	18.10	20.00	21.90	23.80	25.75	27.65	29.55
80	12.30	14.20	16.10	18.05	19.95	21.85	23.75	25.65	27.55	29.45

1/ IF VOLUME OF AVERAGE LOG DOES NOT FALL ON VOLUMES LISTED, USE COST OF THE NEXT LOWER LOG VOLUME.  
 2/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

3/ CORRECTION FOR SLOPE - UPHILL YARDING - SUBTRACT \$0.42 FOR EACH 10 PER CENT OF SLOPE FROM 0 PER CENT TO 60 PER CENT. USE THE VALUE FOR 60 PER CENT FOR SLOPES EXCEEDING 60 PER CENT. DOWNHILL YARDING - ADD \$0.42 FOR EACH 10 PER CENT OF SLOPE FROM 0 TO 30 PER CENT. USE THE VALUE FOR 30 PER CENT FOR SLOPES EXCEEDING 30 PER CENT.

4/ FOR DISTANCES EXCEEDING 1,000', ADD \$1.90 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX 1, PAGES 137, 138, 143, 144, 275 & 276

HIGH-LEAD YARDING - WASHINGTON 78A  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED 1/ 2/

TABLE 27

16 FT. LOG VOLUME SCRIB. DEC.C.	100	200	300	400	500	600	700	800	900	1000
8	45.15	46.70	48.25	49.80	51.30	52.85	54.40	55.95	57.50	59.05
10	33.80	35.35	36.90	38.45	40.00	41.50	43.05	44.60	46.15	47.70
12	26.20	27.75	29.30	30.85	32.35	33.90	35.45	37.00	38.55	40.10
14	21.10	22.65	24.15	25.70	27.25	28.80	30.35	31.90	33.45	35.00
16	17.65	19.20	20.75	22.30	23.85	25.35	26.90	28.45	30.00	31.55
18	15.35	16.90	18.45	20.00	21.50	23.05	24.60	26.15	27.70	29.25
20	13.80	15.35	16.90	18.40	19.95	21.50	23.05	24.60	26.15	27.70
22	12.75	14.30	15.85	17.35	18.90	20.45	22.00	23.55	25.10	26.65
24	12.05	13.55	15.10	16.65	18.20	19.75	21.30	22.85	24.40	25.90
26	11.55	13.10	14.65	16.15	17.70	19.25	20.80	22.35	23.90	25.45
28	11.20	12.75	14.30	15.85	17.40	18.95	20.45	22.00	23.55	25.10
30	11.00	12.50	14.05	15.60	17.15	18.70	20.25	21.80	23.35	24.85
35	10.65	12.20	13.75	15.30	16.85	18.35	19.90	21.45	23.00	24.55
40	10.50	12.05	13.60	15.15	16.65	18.20	19.75	21.30	22.85	24.40
45	10.40	11.95	13.50	15.05	16.60	18.10	19.65	21.20	22.75	24.30
50	10.35	11.85	13.40	14.95	16.50	18.05	19.60	21.15	22.70	24.20
55	10.25	11.80	13.35	14.90	16.45	18.00	19.55	21.05	22.60	24.15
60	10.20	11.75	13.30	14.85	16.40	17.90	19.45	21.00	22.55	24.10
65	10.15	11.70	13.25	14.75	16.30	17.85	19.40	20.95	22.50	24.05
70	10.10	11.65	13.20	14.70	16.25	17.80	19.35	20.90	22.45	24.00
75	10.00	11.55	13.10	14.65	16.20	17.75	19.30	20.85	22.35	23.90
80	9.95	11.50	13.05	14.60	16.15	17.70	19.25	20.75	22.30	23.85

1/ IF VOLUME OF AVERAGE LOG DOES NOT FALL ON VOLUMES LISTED, USE COST OF THE NEXT LOWER LOG VOLUME.  
2/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

3/ CORRECTION FOR SLOPE - UPHILL YARDING - SUBTRACT \$0.31 FOR EACH 10 PER CENT OF SLOPE FROM 0 PER CENT TO 60 PER CENT. USE THE VALUE FOR 60 PER CENT FOR SLOPES EXCEEDING 60 PER CENT. DOWNHILL YARDING - ADD \$0.31 FOR EACH 10 PER CENT OF SLOPE FROM 0 TO 30 PER CENT. USE THE VALUE FOR 30 PER CENT FOR SLOPES EXCEEDING 30 PER CENT.

4/ FOR DISTANCES EXCEEDING 1,000', ADD \$1.55 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX I, PAGES 137, 138, 275 AND 276

RIGGING, YARDING AND LOADING

9353.3 - PRODUCTION COSTS  
(Schedule 20)

Illustration 2, Page 31  
(.33)

9353.3 - PRODUCTION COSTS  
(Schedule 20)

## RIGGING, YARDING AND LOADING

TABLE 28

LOADING - HIGH-LEAD OPERATIONS -  
WESTERN OREGON

COSTS IN DOLLARS PER M9F GROSS VOLUME LOADED 1/ 2/ 3/

16 FT. LOG VOLUME SCRI9. DEC.G.	YARDING (SLOPE) DISTANCE IN FEET 4/ 5/									
	100	200	300	400	500	600	700	800	900	1000
8	10.60	11.00	11.35	11.70	12.05	12.45	12.80	13.15	13.55	13.90
10	7.95	8.30	8.70	9.05	9.40	9.75	10.15	10.50	10.85	11.20
12	6.15	6.55	6.90	7.25	7.60	8.00	8.35	8.70	9.05	9.45
14	4.95	5.30	5.70	6.05	6.40	6.80	7.15	7.50	7.85	8.25
16	4.15	4.50	4.90	5.25	5.60	5.95	6.35	6.70	7.05	7.40
18	3.60	3.95	4.35	4.70	5.05	5.45	5.80	6.15	6.50	6.90
20	3.25	3.60	3.95	4.35	4.70	5.05	5.40	5.80	6.15	6.50
22	3.00	3.35	3.70	4.10	4.45	4.80	5.20	5.55	5.90	6.25
24	2.85	3.20	3.55	3.90	4.30	4.65	5.00	5.35	5.75	6.10
26	2.70	3.10	3.45	3.80	4.15	4.55	4.90	5.25	5.60	6.00
28	2.65	3.00	3.35	3.75	4.10	4.45	4.80	5.20	5.55	5.90
30	2.60	2.95	3.30	3.65	4.05	4.40	4.75	5.10	5.50	5.85
35	2.50	2.85	3.25	3.60	3.95	4.30	4.70	5.05	5.40	5.75
40	2.45	2.85	3.20	3.55	3.90	4.30	4.65	5.00	5.35	5.75
45	2.45	2.80	3.15	3.55	3.90	4.25	4.65	5.00	5.35	5.70
50	2.45	2.80	3.15	3.50	3.90	4.25	4.60	4.95	5.35	5.70
55	2.40	2.80	3.15	3.50	3.85	4.25	4.60	4.95	5.30	5.70
60	2.40	2.75	3.15	3.50	3.85	4.20	4.60	4.95	5.30	5.65
65	2.40	2.75	3.10	3.50	3.85	4.20	4.55	4.95	5.30	5.65
70	2.35	2.75	3.10	3.45	3.80	4.20	4.55	4.90	5.30	5.65
75	2.35	2.70	3.10	3.45	3.80	4.15	4.55	4.90	5.25	5.65
80	2.35	2.70	3.05	3.45	3.80	4.15	4.50	4.90	5.25	5.60

1/ THESE COSTS APPLY WHERE LOADING PRODUCTION IS LIMITED BY YARDING PRODUCTION.

2/ IF VOLUME OF AVERAGE LOG DOES NOT FALL ON VOLUMES LISTED, USE COST OF THE NEXT LOWER LOG VOLUME.

3/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

4/ CORRECTION FOR SLOPE - UPHILL YARDING - SUBTRACT \$0.11 FOR EACH 10 PER CENT OF SLOPE FROM 0 PER CENT TO 60 PER CENT. USE THE VALUE FOR 60 PER CENT FOR SLOPES EXCEEDING 60 PER CENT. DOWNHILL YARDING - ADD \$0.11 FOR EACH 10 PER CENT OF SLOPE FROM 0 TO 30 PER CENT. USE THE VALUE FOR 30 PER CENT FOR SLOPES EXCEEDING 30 PER CENT.

5/ FOR DISTANCES EXCEEDING 1,000', ADD \$0.35 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX 1, PAGES 143, 144, 275 &amp; 276



9353.3 - PRODUCTION COSTS  
(Schedule 20)  
RIGGING, YARDING AND LOADING

TABLE 29

HIGH LEAD RIGGING - WESTERN OREGON

Includes: Yarder and tower  
Large mobile log loader  
Tractor w/dozer (yarding tractor)  
6 man yarding crew  
2 man loading crew  
2 man landing construction crew (part time)

-Medium Yarder (Washington 78A)

First Pole \$1,170

1/ Additional Poles 540 (each)

-Portable Tower - 90' Tower

First Pole 1,090

1/ Additional Poles 545 (each)

-Portable Tower - 110' Tower

First Pole 1,230

1/ Additional Poles 550 (each)

1/ Poles within 1/2 mile of previous pole.

Move in costs not included. See Table 1 for appropriate move in costs. These rigging costs are suggested as guidelines. The appraiser should judge each logging situation individually and develop appropriate rigging costs.

Basic Data, Appendix 1, Pages 145 thru 156



RIGGING, YARDING AND LOADING

TABLE 30

PORTABLE TOWER YARDING AND LOADING - 90° PORTABLE TOWER YARDER  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED AND LOADED 1 / 2 /

16 FT. LOG VOLUME SCRIB. DEC.C.	100	200	300	400	500	600	700	800	900	1000
8	56.85	58.80	60.75	62.70	64.65	66.60	68.55	70.45	72.40	74.35
10	42.60	44.50	46.45	48.40	50.35	52.30	54.25	56.20	58.15	60.10
12	33.00	34.95	36.90	38.85	40.75	42.70	44.65	46.60	48.55	50.50
14	26.55	28.50	30.45	32.40	34.35	36.30	38.25	40.15	42.10	44.05
16	22.25	24.20	26.10	28.05	30.00	31.95	33.90	35.85	37.80	39.75
18	19.35	21.25	23.20	25.15	27.10	29.05	31.00	32.95	34.90	36.85
20	17.35	19.30	21.25	23.20	25.15	27.10	29.05	31.00	32.90	34.85
22	16.05	18.00	19.95	21.90	23.80	25.75	27.70	29.65	31.60	33.55
24	15.15	17.10	19.05	21.00	22.95	24.85	26.80	28.75	30.70	32.65
26	14.55	16.50	18.45	20.35	22.30	24.25	26.20	28.15	30.10	32.05
28	14.10	16.05	18.00	19.95	21.90	23.85	25.80	27.75	29.65	31.60
30	13.85	15.75	17.70	19.65	21.60	23.55	25.50	27.45	29.40	31.35
35	13.40	15.35	17.30	19.25	21.20	23.15	25.10	27.05	28.95	30.90
40	13.20	15.15	17.10	19.05	21.00	22.95	24.90	26.85	28.80	30.70
45	13.10	15.05	17.00	18.95	20.90	22.80	24.75	26.70	28.65	30.60
50	13.00	14.95	16.90	18.85	20.80	22.75	24.65	26.60	28.55	30.50
55	12.95	14.85	16.80	18.75	20.70	22.65	24.60	26.55	28.50	30.45
60	12.85	14.80	16.75	18.70	20.65	22.55	24.50	26.45	28.40	30.35
65	12.75	14.70	16.65	18.60	20.55	22.50	24.45	26.40	28.35	30.30
70	12.70	14.65	16.60	18.55	20.50	22.40	24.35	26.30	28.25	30.20
75	12.60	14.55	16.50	18.45	20.40	22.35	24.30	26.25	28.20	30.15
80	12.55	14.50	16.45	18.40	20.35	22.25	24.20	26.15	28.10	30.05

1/ IF VOLUME OF AVERAGE LOG DOES NOT FALL ON VOLUMES LISTED, USE THE COST OF THE NEXT LOWER LOG VOLUME.  
2/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

3/ CORRECTION FOR SLOPE - UPHILL YARDING - SUBTRACT \$0.41 FOR EACH 10 PER CENT OF SLOPE FROM 0 TO 60 PER CENT. USE THE VALUE FOR 60 PER CENT FOR SLOPES EXCEEDING 60 PER CENT. DOWNHILL YARDING - ADD \$0.35 FOR EACH 10 PER CENT OF SLOPE FROM 0 TO 30 PER CENT. USE THE VALUE FOR 30 PER CENT FOR SLOPES EXCEEDING 30 PER CENT.

4/ FOR DISTANCES EXCEEDING 1,000', ADD \$1.95 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA. APPENDIX 1. PAGES 139, 140, 143, 144, 275 AND 276

PORTABLE TOWER YARDING - 90° PORTABLE TOWER YARDER  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED 1/ 2/

TABLE 31

16 FT. LOG VOLUME SCRIA. OEC.C.	YARDING (SLOPE) DISTANCE IN FEET 3/ 4/									
	100	200	300	400	500	600	700	800	900	1000
8	46.25	47.80	49.40	51.00	52.55	54.15	55.75	57.30	58.90	60.45
10	34.65	36.20	37.80	39.35	40.95	42.55	44.10	45.70	47.30	48.85
12	26.85	28.40	30.00	31.55	33.15	34.75	36.30	37.90	39.50	41.05
14	21.60	23.20	24.75	26.35	27.90	29.50	31.10	32.65	34.25	35.85
16	18.10	19.65	21.25	22.85	24.40	26.00	27.55	29.15	30.75	32.30
18	15.70	17.30	18.90	20.45	22.05	23.60	25.20	26.80	28.35	29.95
20	14.10	15.70	17.30	18.85	20.45	22.05	23.60	25.20	26.80	28.35
22	13.05	14.65	16.20	17.80	19.35	20.95	22.55	24.10	25.70	27.30
24	12.30	13.90	15.50	17.05	18.65	20.25	21.80	23.40	24.95	26.55
26	11.30	13.40	15.00	16.55	18.15	19.75	21.30	22.90	24.45	26.05
28	11.50	13.05	14.65	16.25	17.80	19.40	20.95	22.55	24.15	25.70
30	11.25	12.85	14.40	16.00	17.55	19.15	20.75	22.30	23.90	25.50
35	10.90	12.50	14.05	15.65	17.25	18.80	20.40	22.00	23.55	25.15
40	10.75	12.35	13.90	15.50	17.10	18.65	20.25	21.80	23.40	25.00
45	10.65	12.25	13.80	15.40	17.00	18.55	20.15	21.70	23.30	24.90
50	10.60	12.15	13.75	15.30	16.90	18.50	20.05	21.65	23.25	24.80
55	10.50	12.10	13.70	15.25	16.85	18.40	20.00	21.60	23.15	24.75
60	10.45	12.05	13.60	15.20	16.80	18.35	19.95	21.50	23.10	24.70
65	10.40	11.95	13.55	15.15	16.70	18.30	19.90	21.45	23.05	24.60
70	10.35	11.90	13.50	15.05	16.65	18.25	19.80	21.40	23.00	24.55
75	10.25	11.85	13.45	15.00	16.60	18.15	19.75	21.35	22.90	24.50
80	10.20	11.80	13.35	14.95	16.55	18.10	19.70	21.30	22.85	24.45

1/ IF VOLUME OF AVERAGE LOG DOES NOT FALL ON VOLUMES LISTED, USE THE COST OF THE NEXT LOWER LOG VOLUME.  
2/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

3/ CORRECTION FOR SLOPE - UPHILL YARDING - SUBTRACT \$0.35 FOR EACH 10 PER CENT OF SLOPE FROM 0 TO 60 PER CENT. USE THE VALUE FOR 60 PER CENT FOR SLOPES EXCEEDING 60 PER CENT. DOWNHILL YARDING - ADD \$0.35 FOR EACH 10 PER CENT OF SLOPE FROM 0 TO 30 PER CENT. USE THE VALUE FOR 30 PER CENT FOR SLOPES EXCEEDING 30 PER CENT.

4/ FOR DISTANCES EXCEEDING 1,000', ADD \$1.60 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX I, PAGES 139, 140, 275 AND 276

YARDING, YARDING AND LOADING

9353.3 - PRODUCTION COSTS  
(Schedule 20)

Illustration 2, Page 35  
(.33)

TABLE 32

PORTABLE TOWER YARDING AND LOADING - 110" TRAILER MOUNTED TOWER  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED AND LOADED 1/ 2/

16 FT. LOG VOLUME SCRIB. DEC.C.	100	200	300	400	500	600	700	800	900	1000
8	67.60	63.90	72.20	74.50	76.85	79.15	81.45	83.75	86.10	88.40
10	50.60	52.90	55.25	57.55	59.85	62.15	64.50	66.80	69.10	71.40
12	39.23	41.55	43.85	46.15	48.45	50.75	53.10	55.40	57.70	60.00
14	31.55	33.90	36.20	38.50	40.80	43.15	45.45	47.75	50.05	52.35
16	26.45	28.75	31.05	33.35	35.70	38.00	40.30	42.60	44.90	47.25
18	22.95	25.30	27.60	29.90	32.20	34.55	36.85	39.15	41.45	43.80
20	20.65	22.95	25.25	27.60	29.90	32.20	34.50	36.80	39.15	41.45
22	19.05	21.40	23.70	26.00	28.30	30.65	32.95	35.25	37.55	39.90
24	18.00	20.30	22.65	24.95	27.25	29.55	31.90	34.20	36.50	38.80
26	17.30	19.60	21.90	24.20	26.55	28.85	31.15	33.45	35.75	38.10
28	16.80	19.10	21.40	23.70	26.05	28.35	30.65	32.95	35.25	37.60
30	16.45	18.75	21.05	23.35	25.70	28.00	30.30	32.60	34.95	37.25
35	15.95	18.25	20.55	22.90	25.20	27.50	29.80	32.15	34.45	36.75
40	15.70	18.00	20.35	22.65	24.95	27.25	29.60	31.90	34.20	36.50
45	15.55	17.90	20.20	22.50	24.80	27.15	29.45	31.75	34.05	36.35
50	15.45	17.75	20.10	22.40	24.70	27.00	29.35	31.65	33.95	36.25
55	15.35	17.70	20.00	22.30	24.60	26.90	29.25	31.55	33.85	36.15
60	15.25	17.60	19.90	22.20	24.50	26.85	29.15	31.45	33.75	36.10
65	15.20	17.50	19.80	22.10	24.45	26.75	29.05	31.35	33.70	36.00
70	15.10	17.40	19.70	22.05	24.35	26.65	28.95	31.25	33.60	35.90
75	15.00	17.30	19.65	21.95	24.25	26.55	28.85	31.20	33.50	35.80
80	14.90	17.25	19.55	21.85	24.15	26.45	28.80	31.10	33.40	35.70

1/ IF VOLUME OF AVERAGE LOG DOES NOT FALL ON VOLUMES LISTED, USE THE COST OF THE NEXT LOWER LOG VOLUME.  
2/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

3/ CORRECTION FOR SLOPE - UPHILL YARDING - SUBTRACT \$0.50 FOR EACH 10 PER CENT OF SLOPE FROM 0 TO 60 PER CENT. USE THE VALUE FOR 60 PER CENT FOR SLOPES EXCEEDING 60 PER CENT. DOWNHILL YARDING - ADD \$0.50 FOR EACH 10 PER CENT OF SLOPE FROM 0 TO 30 PER CENT. USE THE VALUE FOR 30 PER CENT FOR SLOPES EXCEEDING 30 PER CENT.

4/ FOR DISTANCES EXCEEDING 1,000', ADD \$2.30 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX 1, PAGES 141 THRU 144, 275 AND 276



PORTABLE TOWER YARDING - 110" TRAILER MOUNTED TOWER  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED 1/ 2/

TABLE 33

16 FT. LOG VOLUME SCRIB. DEC.G.	YARDING (SLOPE) DISTANCE IN FEET 3/ 4/									
	100	200	300	400	500	600	700	800	900	1000
8	56.95	58.90	60.85	62.80	64.75	66.70	68.65	70.60	72.55	74.50
10	42.65	44.60	46.55	48.50	50.45	52.40	54.35	56.30	58.25	60.20
12	33.05	35.00	36.95	38.90	40.85	42.80	44.75	46.70	48.65	50.60
14	26.60	28.55	30.50	32.45	34.40	36.35	38.30	40.25	42.20	44.15
16	22.30	24.25	26.15	28.10	30.05	32.00	33.95	35.90	37.85	39.80
18	19.35	21.30	23.25	25.20	27.15	29.10	31.05	33.00	34.95	36.90
20	17.40	19.35	21.30	23.25	25.20	27.15	29.10	31.05	33.00	34.95
22	16.10	18.00	19.95	21.90	23.85	25.80	27.75	29.70	31.65	33.60
24	15.20	17.15	19.05	21.00	22.95	24.90	26.85	28.80	30.75	32.70
26	14.55	16.50	18.45	20.40	22.35	24.30	26.25	28.20	30.15	32.10
28	14.15	16.10	18.05	20.00	21.95	23.90	25.85	27.80	29.75	31.70
30	13.95	15.80	17.75	19.70	21.65	23.60	25.55	27.50	29.45	31.40
35	13.45	15.40	17.35	19.30	21.25	23.20	25.15	27.10	29.05	31.00
40	13.25	15.20	17.15	19.10	21.05	23.00	24.95	26.90	28.85	30.80
45	13.10	15.05	17.00	18.95	20.90	22.85	24.80	26.75	28.70	30.65
50	13.05	15.00	16.95	18.90	20.85	22.75	24.70	26.65	28.60	30.55
55	12.95	14.90	16.85	18.80	20.75	22.70	24.65	26.60	28.55	30.50
60	12.85	14.80	16.75	18.70	20.65	22.60	24.55	26.50	28.45	30.40
65	12.80	14.75	16.70	18.65	20.60	22.55	24.50	26.45	28.40	30.35
70	12.70	14.65	16.60	18.55	20.50	22.45	24.40	26.35	28.30	30.25
75	12.65	14.60	16.55	18.50	20.45	22.40	24.35	26.30	28.25	30.20
80	12.55	14.50	16.45	18.40	20.35	22.30	24.25	26.20	28.15	30.10

1/ IF VOLUME OF AVERAGE LOG DOES NOT FALL ON VOLUMES LISTED, USE THE COST OF THE NEXT LOWER LOG VOLUME.  
2/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

3/ CORRECTION FOR SLOPE - UPHILL YARDING - SUBTRACT \$0.37 FOR EACH 10 PER CENT OF SLOPE FROM 0 TO 60 PER CENT. USE THE VALUE FOR 60 PER CENT FOR SLOPES EXCEEDING 60 PER CENT. DOWNHILL YARDING - ADD \$0.37 FOR EACH 10 PER CENT OF SLOPE FROM 0 TO 30 PER CENT. USE THE VALUE FOR 30 PER CENT FOR SLOPES EXCEEDING 30 PER CENT.

4/ FOR DISTANCES EXCEEDING 1,000', ADD \$1.95 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX 1, PAGES 141, 142, 257 AND 276

RIGGING, YARDING AND LOADING

9353.3 - PRODUCTION COST  
(Schedule 20)

Illustration 2, Page 3/  
(.33)



9353.3 - PRODUCTION COSTS  
(Schedule 20)  
RIGGING, YARDING AND LOADING

TABLE 34

PORTABLE TOWER LOADING COSTS

See Table 28 - Loading - High-Lead Operations

Basic Data, Appendix 1, Pages 143, 144, 275 & 276

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
RIGGING, YARDING AND LOADING

TABLE 35

STATIC SKYLINE RIGGING - WESTERN OREGON

110' Portable Tower

Includes: Tower and yarder, single drum sky car and  
associated rigging.

Large mobile log loader  
Tractor w/dozer (yarding tractor)  
8-man yarding and loading crew  
Tractor operator to assist in landing  
construction and rig up

First and each other additional pole        \$3975 (each)

Tail Hold

First Tail Hold                                \$1560

Additional Tail Holds                        \$1315

Move in costs not included. See Table 1 for appropriate move in costs. These rigging costs are suggested as guidelines. In order to develop appropriate rigging costs, the appraiser must have an understanding of basic skyline engineering, layout and design. He must be able to predict the location and number of skyline roads, tower or rigged tree setups, and tail holds.

Basic Data, Appendix 1, Pages 161 thru 166

TABLE 36 A

STATIC SKYLINE YARDING AND LOADING-PORTABLE TOWER IN CLEAR CUTS  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED AND LOADED 1/ 2/ 3/

16 FT. LOG VOLUME SCRIB. DEC.C.	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800
10	41.40	42.00	42.75	43.55	44.50	45.55	46.70	47.95	49.30	50.80	52.40	54.10	55.90	57.80
12	32.20	32.80	33.55	34.35	35.30	36.35	37.50	38.75	40.10	41.60	43.20	44.90	46.70	48.60
14	26.05	26.65	27.35	28.20	29.10	30.15	31.30	32.55	33.95	35.40	37.00	38.70	40.50	42.45
16	21.90	22.50	23.25	24.05	25.00	26.05	27.20	28.45	29.80	31.30	32.90	34.55	36.40	38.30
18	19.15	19.75	20.45	21.30	22.20	23.25	24.40	25.65	27.05	28.50	30.10	31.80	33.60	35.55
20	17.30	17.90	18.60	19.45	20.35	21.40	22.55	23.80	25.20	26.65	28.25	29.95	31.75	33.65
22	16.05	16.65	17.35	18.20	19.10	20.15	21.30	22.55	23.95	25.40	27.00	28.70	30.50	32.45
24	15.20	15.80	16.50	17.35	18.30	19.30	20.45	21.75	23.10	24.60	26.15	27.85	29.65	31.60
26	14.65	15.25	15.95	16.80	17.70	18.75	19.90	21.15	22.55	24.00	25.60	27.30	29.10	31.05
28	14.25	14.90	15.60	16.40	17.35	18.40	19.55	20.80	22.15	23.65	25.25	26.95	28.75	30.65
30		14.65	15.35	16.15	17.10	18.15	19.30	20.55	21.90	23.40	25.00	26.70	28.50	30.40
32		14.45	15.15	16.00	16.90	17.95	19.10	20.35	21.75	23.20	24.80	26.50	28.30	30.25
34		14.35	15.05	15.90	16.80	17.85	19.00	20.25	21.65	23.10	24.70	26.40	28.20	30.10
36		14.25	15.00	15.80	16.75	17.80	18.95	20.20	21.55	23.05	24.60	26.30	28.15	30.05
38		14.20	14.95	15.75	16.70	17.70	18.85	20.15	21.50	23.00	24.55	26.25	28.10	30.00
40			14.90	15.70	16.65	17.70	18.85	20.10	21.45	22.95	24.55	26.25	28.05	29.95
45			14.85	15.65	16.60	17.65	18.80	20.05	21.45	22.90	24.50	26.20	28.00	29.90
50			14.85	15.65	16.60	17.65	18.80	20.05	21.40	22.90	24.50	26.20	28.00	29.90
55			14.85	15.65	16.60	17.60	18.80	20.05	21.40	22.90	24.45	26.15	28.00	29.90
60			14.85	15.65	16.60	17.60	18.75	20.05	21.40	22.90	24.45	26.15	28.00	29.90
65			14.85	15.65	16.60	17.60	18.75	20.05	21.40	22.90	24.45	26.15	28.00	29.90
70			14.85	15.65	16.60	17.60	18.75	20.05	21.40	22.90	24.45	26.15	28.00	29.90
75			14.85	15.65	16.60	17.60	18.75	20.05	21.40	22.90	24.45	26.15	28.00	29.90
80			14.85	15.65	16.60	17.60	18.75	20.05	21.40	22.90	24.45	26.15	28.00	29.90
85			14.85	15.65	16.60	17.60	18.75	20.05	21.40	22.90	24.45	26.15	28.00	29.90

1/ IF AVERAGE LOG VOLUME DOES NOT FALL ON VOLUME LISTED, USE THE COST OF THE NEXT LOWER LOG VOLUME.  
2/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

3/ YARDING EQUIPMENT: YARDER, SINGLE DRUM, PORTABLE TOWER, RADIO-CONTROLLED SKYCAR.

STATIC SKYLINE YARDING AND LOADING-PORTABLE TOWER IN CLEAR CUTS  
WESTERN OREGON

COSTS IN DOLLARS PER M9F GROSS VOLUME YARDED AND LOADED 1/ 2/ 3/

TABLE 36 B

9353.3 - PRODUCTION COSTS  
(Schedule 20)

RICING, YARDING AND LOADING

Illustration 2, Page 41  
(.33)

16 FT. LOG VOLUME SCRIB.		YARDING (SLOPE) DISTANCE IN FEET 4/													
DEC.C.	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000	3100	3200	
10	59.85	61.95	64.20	66.55	69.05	71.60	74.30	77.10	80.00	83.00	86.15	89.35	92.70	96.15	
12	50.65	52.75	55.00	57.35	59.85	62.40	65.10	67.90	70.80	73.80	76.95	80.15	83.50	86.95	
14	44.45	46.50	48.85	51.20	53.65	56.25	58.95	61.70	64.60	67.65	70.75	74.00	77.35	80.80	
16	40.35	42.45	44.70	47.05	49.55	52.10	54.80	57.60	60.50	63.50	66.65	69.85	73.20	76.65	
18	37.55	39.70	41.95	44.30	46.75	49.35	52.00	54.80	57.70	60.75	63.85	67.10	70.45	73.90	
20	35.70	37.85	40.10	42.45	44.90	47.50	50.15	52.95	55.85	58.85	62.00	65.25	68.55	72.00	
22	34.45	36.60	38.85	41.20	43.65	46.25	48.90	51.70	54.60	57.65	60.75	64.00	67.35	70.80	
24	33.60	35.75	38.00	40.35	42.80	45.40	48.10	50.90	53.80	56.80	59.90	63.15	66.50	69.95	
26	33.05	35.20	37.45	39.80	42.25	44.85	47.50	50.30	53.20	56.25	59.35	62.60	65.95	69.40	
28	32.70	34.90	37.05	39.40	41.90	44.45	47.15	49.95	52.85	55.85	59.00	62.20	65.55	69.00	
30	32.45	34.55	36.80	39.15	41.65	44.20	46.90	49.70	52.60	55.60	58.75	61.95	65.30	68.75	
32	32.25	34.40	36.65	39.00	41.45	44.05	46.75	49.50	52.45	55.45	58.55	61.80	65.15	68.60	
34	32.15	34.30	36.55	38.90	41.35	43.95	46.60	49.40	52.30	55.35	58.45	61.70	65.05	68.50	
36	32.10	34.20	36.45	38.80	41.30	43.85	46.55	49.35	52.25	55.25	58.35	61.60	64.95	68.40	
38	32.00	34.15	36.40	38.75	41.25	43.80	46.50	49.30	52.20	55.20	58.30	61.55	64.90	68.35	
40	32.00	34.15	36.35	38.75	41.20	43.75	46.45	49.25	52.15	55.15	58.30	61.50	64.85	68.30	
45	31.95	34.10	36.35	38.70	41.15	43.75	46.40	49.20	52.10	55.10	58.25	61.50	64.80	68.25	
50	31.95	34.05	36.30	38.65	41.15	43.70	46.40	49.20	52.10	55.10	58.25	61.45	64.80	68.25	
55	31.90	34.05	36.30	38.65	41.15	43.70	46.40	49.20	52.10	55.10	58.20	61.45	64.80	68.25	
60	31.90	34.05	36.30	38.65	41.15	43.70	46.40	49.20	52.10	55.10	58.20	61.45	64.80	68.25	
65	31.90	34.05	36.30	38.65	41.15	43.70	46.40	49.20	52.10	55.10	58.20	61.45	64.80	68.25	
70	31.90	34.05	36.30	38.65	41.15	43.70	46.40	49.20	52.10	55.10	58.20	61.45	64.80	68.25	
75	31.90	34.05	36.30	38.65	41.15	43.70	46.40	49.20	52.10	55.10	58.20	61.45	64.80	68.25	
80	31.90	34.05	36.30	38.65	41.15	43.70	46.40	49.20	52.10	55.10	58.20	61.45	64.80	68.25	
85	31.90	34.05	36.30	38.65	41.15	43.70	46.40	49.20	52.10	55.10	58.20	61.45	64.80	68.25	

1/ IF AVERAGE LOG VOLUME DOES NOT FALL ON VOLUME LISTED, USE THE COST OF THE NEXT LOWER LOG VOLUME.  
2/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

3/ YARDING EQUIPMENT: YARDER, SINGLE DRUM, PORTABLE TOWER, RADIO-CONTROLLED SKYCAR.

4/ ADD \$3.45 FOR EACH ADDITIONAL 100 FT. BEYOND 3200 FT.

BASIC DATA, APPENDIX I. PAGES 157 THRU 160, 277 THRU 279



RIGGING, YARDING AND LOADING

TABLE 37A

STATIC SKYLINE YARDING-PORTABLE TOWER IN CLEAR CUTS  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED 1/ 2/ 3/

16 FT. LOG VOLUME SERIES	YARDING (SLOPE) DISTANCE IN FEET															
DEC.C.	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800		
10	36.80	37.35	38.00	38.70	39.55	40.45	41.50	42.60	43.80	45.15	46.55	48.05	49.65	51.35		
12	29.65	29.15	29.80	30.55	31.35	32.30	33.30	34.45	35.65	36.95	38.35	39.90	41.50	43.20		
14	23.15	23.70	24.30	25.05	25.90	26.80	27.85	28.95	30.15	31.50	32.90	34.40	36.00	37.70		
16	19.50	20.00	20.65	21.40	22.20	23.15	24.15	25.25	26.50	27.80	29.20	30.75	32.35	34.05		
18	17.00	17.55	18.20	18.90	19.75	20.65	21.70	22.80	24.05	25.35	26.75	28.25	29.85	31.55		
20	15.35	15.90	16.55	17.25	18.10	19.00	20.05	21.15	22.40	23.70	25.10	26.60	28.20	29.90		
22	14.25	14.80	15.45	16.15	17.00	17.90	18.95	20.05	21.25	22.60	24.00	25.50	27.10	28.80		
24	13.50	14.05	14.70	15.40	16.25	17.15	18.20	19.30	20.55	21.85	23.25	24.75	26.35	28.10		
26	13.00	13.55	14.20	14.90	15.75	16.65	17.70	18.80	20.05	21.35	22.75	24.25	25.85	27.60		
28	12.70	13.20	13.85	14.60	15.40	16.35	17.35	18.50	19.70	21.00	22.40	23.95	25.55	27.25		
30		13.00	13.65	14.35	15.20	16.10	17.15	18.25	19.45	20.80	22.20	23.70	25.30	27.00		
32		12.85	13.50	14.20	15.05	15.95	17.00	18.10	19.30	20.65	22.05	23.55	25.15	26.85		
34		12.75	13.40	14.10	14.95	15.85	16.90	18.00	19.20	20.55	21.95	23.45	25.05	26.75		
36		12.70	13.30	14.05	14.85	15.80	16.80	17.95	19.15	20.45	21.90	23.40	25.00	26.70		
38		12.65	13.25	14.00	14.85	15.75	16.75	17.90	19.10	20.45	21.85	23.35	24.95	26.65		
40			13.25	13.95	14.80	15.70	16.75	17.85	19.10	20.40	21.80	23.30	24.90	26.65		
45			13.20	13.95	14.75	15.70	16.70	17.85	19.05	20.35	21.75	23.30	24.90	26.60		
50			13.20	13.90	14.75	15.65	16.70	17.80	19.05	20.35	21.75	23.25	24.85	26.60		
55			13.20	13.90	14.75	15.65	16.70	17.80	19.00	20.35	21.75	23.25	24.85	26.55		
60			13.20	13.90	14.75	15.65	16.70	17.80	19.00	20.35	21.75	23.25	24.85	26.55		
65			13.20	13.90	14.75	15.65	16.70	17.80	19.00	20.35	21.75	23.25	24.85	26.55		
70			13.20	13.90	14.75	15.65	16.70	17.80	19.00	20.35	21.75	23.25	24.85	26.55		
75			13.20	13.90	14.75	15.65	16.70	17.80	19.00	20.35	21.75	23.25	24.85	26.55		
80			13.20	13.90	14.75	15.65	16.70	17.80	19.00	20.35	21.75	23.25	24.85	26.55		
85			13.20	13.90	14.75	15.65	16.70	17.80	19.00	20.35	21.75	23.25	24.85	26.55		

1/ IF AVERAGE LOG VOLUME DOES NOT FALL ON VOLUME LISTED, USE THE COST OF THE NEXT LOWER LOG VOLUME.  
 2/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

3/ YARDING EQUIPMENT: YARDER, SINGLE DRUM, PORTABLE TOWER, RADIO-CONTROLLED SKYCAR.

9353.3 - PRODUCTION COSTS  
(Schedule 20)

RIGGING, YARDING AND LOADING

TABLE 37B

STATIC SKYLINE YARDING-PORTABLE TOWER IN CLEAR CUTS  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED 1/ 2/ 3/

16 FT. LOG VOLUME SCRIB. DEC.C.	YARDING (SLOPE) DISTANCE IN FEET 4/											
	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000
10	53.15	55.05	57.05	59.15	61.35	63.65	66.05	68.50	71.10	73.75	76.55	79.40
12	45.00	46.90	48.90	51.00	53.20	55.45	57.85	60.35	62.90	65.60	68.35	71.25
14	39.50	41.40	43.40	45.50	47.70	50.00	52.35	54.85	57.45	60.10	62.90	65.75
16	35.85	37.75	39.75	41.85	44.00	46.30	48.70	51.20	53.75	56.45	59.20	62.10
18	33.40	35.30	37.25	39.35	41.55	43.85	46.25	48.70	51.30	53.95	56.75	59.60
20	31.75	33.60	35.60	37.70	39.90	42.20	44.60	47.05	49.65	52.30	55.10	57.95
22	30.60	32.50	34.50	36.60	38.80	41.10	43.45	45.95	48.55	51.20	54.00	56.85
24	29.90	31.80	33.75	35.85	38.05	40.35	42.75	45.20	47.80	50.45	53.25	56.10
26	29.40	31.30	33.30	35.35	37.55	39.85	42.25	44.70	47.30	50.00	52.75	55.65
28	29.05	30.95	32.95	35.05	37.25	39.50	41.90	44.40	46.95	49.65	52.40	55.30
30	28.80	30.70	32.70	34.80	37.00	39.30	41.70	44.15	46.75	49.40	52.20	55.05
32	28.65	30.55	32.55	34.65	36.85	39.15	41.55	44.00	46.60	49.25	52.05	54.90
34	28.55	30.45	32.45	34.55	36.75	39.05	41.45	43.90	46.50	49.15	51.95	54.80
36	28.50	30.40	32.40	34.50	36.70	38.95	41.35	43.85	46.40	49.10	51.90	54.75
38	28.45	30.35	32.35	34.45	36.65	38.95	41.30	43.80	46.40	49.05	51.85	54.70
40	28.45	30.35	32.35	34.40	36.60	38.90	41.30	43.75	46.35	49.05	51.80	54.70
45	28.40	30.30	32.30	34.40	36.55	38.85	41.25	43.75	46.30	49.00	51.75	54.65
50	28.40	30.30	32.25	34.35	36.55	38.85	41.25	43.70	46.30	48.95	51.75	54.60
55	28.35	30.25	32.25	34.35	36.55	38.85	41.25	43.70	46.30	48.95	51.75	54.60
60	28.35	30.25	32.25	34.35	36.55	38.85	41.25	43.70	46.30	48.95	51.75	54.60
65	28.35	30.25	32.25	34.35	36.55	38.85	41.20	43.70	46.30	48.95	51.75	54.60
70	28.35	30.25	32.25	34.35	36.55	38.85	41.20	43.70	46.30	48.95	51.75	54.60
75	28.35	30.25	32.25	34.35	36.55	38.85	41.20	43.70	46.30	48.95	51.75	54.60
80	28.35	30.25	32.25	34.35	36.55	38.85	41.20	43.70	46.30	48.95	51.75	54.60
85	28.35	30.25	32.25	34.35	36.55	38.85	41.20	43.70	46.30	48.95	51.75	54.60

1/ IF AVERAGE LOG VOLUME DOES NOT FALL ON VOLUME LISTED, USE THE COST OF THE NEXT LOWER LOG VOLUME.  
2/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

3/ YARDING EQUIPMENT: YARDER, SINGLE DRUM, PORTABLE TOWER, RADIO-CONTROLLED SKYCAR.

4/ ADD \$.10 FOR EACH ADDITIONAL 100 FT. BEYOND 3200 FT.

BASIC DATA, APPENDIX I, PAGES 157, 158, 277 THRU 279

RIGGING, YARDING AND LOADING

TABLE 38

SWINGING AND LOADING - HIGH-LEAD HOT DECK SWINGING  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME SWUNG AND LOADED 1/ 2/

16 FT. LOG VOLUME SCRIB. DEC.C.	YARDING (SLOPE) DISTANCE IN FEET 3/ 4/									
	100	200	300	400	500	600	700	800	900	1000
8	35.80	37.00	38.25	39.45	40.70	41.90	43.15	44.35	45.60	46.80
10	26.00	28.05	29.25	30.45	31.70	32.90	34.15	35.35	36.60	37.80
12	20.75	22.00	23.20	24.45	25.65	26.90	28.10	29.35	30.55	31.80
14	16.70	17.95	19.15	20.40	21.60	22.85	24.05	25.30	26.50	27.75
16	14.00	15.20	16.45	17.65	18.90	20.10	21.35	22.55	23.80	25.00
18	12.15	13.40	14.60	15.85	17.05	18.30	19.50	20.75	21.95	23.20
20	10.95	12.15	13.40	14.60	15.85	17.05	18.30	19.50	20.75	21.95
22	10.10	11.30	12.55	13.75	15.00	16.20	17.45	18.65	19.90	21.10
24	9.55	10.75	12.00	13.20	14.45	15.65	16.90	18.10	19.35	20.55
26	9.15	10.40	11.60	12.80	14.05	15.25	16.50	17.70	18.95	20.15
28	8.90	10.10	11.35	12.55	13.80	15.00	16.25	17.45	18.70	19.90
30	8.70	9.95	11.15	12.40	13.60	14.80	16.05	17.25	18.50	19.70
35	8.45	9.65	10.90	12.10	13.35	14.55	15.80	17.00	18.25	19.45
40	8.30	9.55	10.75	12.00	13.20	14.45	15.65	16.90	18.10	19.35
45	8.25	9.45	10.70	11.90	13.15	14.35	15.60	16.80	18.05	19.25
50	8.20	9.40	10.65	11.85	13.10	14.30	15.55	16.75	18.00	19.20
55	8.15	9.35	10.60	11.80	13.05	14.25	15.50	16.70	17.95	19.15
60	8.10	9.30	10.55	11.75	13.00	14.20	15.45	16.65	17.90	19.10
65	8.05	9.25	10.50	11.70	12.95	14.15	15.40	16.60	17.85	19.05
70	8.00	9.20	10.45	11.65	12.90	14.10	15.35	16.55	17.80	19.00
75	7.95	9.15	10.40	11.60	12.85	14.05	15.30	16.50	17.75	18.95
80	7.90	9.10	10.35	11.55	12.80	14.00	15.25	16.45	17.70	18.90

1/ IF VOLUME OF AVERAGE LOG DOES NOT FALL ON VOLUMES LISTED, USE THE COST OF THE NEXT LOWER LOG VOLUME.  
2/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

3/ CORRECTION FOR SLOPE - UPHILL YARDING - SUBTRACT \$0.25 FOR EACH 10 PER CENT OF SLOPE FROM 0 TO 60 PER CENT. USE THE VALUE FOR 60 PER CENT FOR SLOPES EXCEEDING 60 PER CENT. DOWNHILL YARDING - ADD \$0.25 FOR EACH 10 PER CENT OF SLOPE FROM 0 TO 30 PER CENT. USE THE VALUE FOR 30 PER CENT FOR SLOPES EXCEEDING 30 PER CENT.

4/ FOR DISTANCES EXCEEDING 1,000', ADD \$1.20 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX I, PAGES 143, 144, 167, 168, 275 & 276



HIGH-LEAD HOT DECK SWINGING  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME SWUNG 1/ 2/

TABLE 39

16 FT. LOG VOLUME SCRIB. DEC.C.	YARDING (SLOPE) DISTANCE IN FEET 3/ 4/									
	100	200	300	400	500	600	700	800	900	1000
8	25.15	26.05	26.90	27.75	28.60	29.50	30.35	31.20	32.05	32.90
10	18.85	19.70	20.55	21.45	22.30	23.15	24.00	24.90	25.75	26.60
12	14.60	15.45	16.35	17.20	18.05	18.90	19.75	20.65	21.50	22.35
14	11.75	12.60	13.50	14.35	15.20	16.05	16.90	17.80	18.65	19.50
16	9.85	10.70	11.55	12.45	13.30	14.15	15.00	15.85	16.75	17.60
18	8.55	9.40	10.30	11.15	12.00	12.85	13.70	14.60	15.45	16.30
20	7.70	8.55	9.40	10.25	11.15	12.00	12.85	13.70	14.60	15.45
22	7.10	7.95	8.85	9.70	10.55	11.40	12.25	13.15	14.00	14.85
24	6.70	7.55	8.45	9.30	10.15	11.00	11.85	12.75	13.60	14.45
26	6.45	7.30	8.15	9.00	9.90	10.75	11.60	12.45	13.30	14.20
28	6.25	7.10	7.95	8.85	9.70	10.55	11.40	12.30	13.15	14.00
30	6.10	7.00	7.85	8.70	9.55	10.45	11.30	12.15	13.00	13.85
35	5.95	6.80	7.65	8.50	9.40	10.25	11.10	11.95	12.85	13.70
40	5.85	6.70	7.55	8.45	9.30	10.15	11.00	11.90	12.75	13.60
45	5.80	6.65	7.50	8.40	9.25	10.15	10.95	11.85	12.70	13.55
50	5.75	6.60	7.50	8.35	9.20	10.05	10.90	11.80	12.65	13.50
55	5.70	6.60	7.45	8.30	9.15	10.05	10.90	11.75	12.60	13.45
60	5.70	6.55	7.40	8.25	9.15	10.00	10.85	11.70	12.60	13.45
65	5.65	6.50	7.40	8.25	9.10	9.95	10.80	11.70	12.55	13.40
70	5.60	6.50	7.35	8.20	9.05	9.95	10.80	11.65	12.50	13.35
75	5.60	6.45	7.30	8.15	9.05	9.90	10.75	11.60	12.50	13.35
80	5.55	6.40	7.30	8.15	9.00	9.85	10.70	11.60	12.45	13.30

1/ IF VOLUME OF AVERAGE LOG DOES NOT FALL ON VOLUMES LISTED, USE THE COST OF THE NEXT LOWER LOG VOLUME.  
2/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

3/ CORRECTION FOR SLOPE - UPHILL YARDING - SUBTRACT \$0.16 FOR EACH 10 PER CENT OF SLOPE FROM 0 TO 60 PER CENT. USE THE VALUE FOR 60 PER CENT FOR SLOPES EXCEEDING 60 PER CENT. DOWNHILL YARDING - ADD \$0.16 FOR EACH 10 PER CENT OF SLOPE FROM 0 TO 30 PER CENT. USE THE VALUE FOR 30 PER CENT FOR SLOPES EXCEEDING 30 PER CENT.

4/ FOR DISTANCES EXCEEDING 1,000', ADD \$0.85 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX 1, PAGES 167, 168, 275 AND 276

RIGGING, YARDING AND LOADING

9353.3 - PRODUCTION COSTS  
(Schedule 20)

Illustration 2, Page 45  
(.33)



(.33) 9353.3 - PRODUCTION COSTS  
(Schedule 20)  
RIGGING, YARDING AND LOADING

TABLE 40

SWING POLE RIGGING - WESTERN OREGON

Tree used for swinging -

Includes: Medium yarder

Tractor w/dozer (yarding tractor)

2 man swing crew

Tractor operator to construct landing

Swing Pole Rigging Cost \$1270

Hot Deck

Move in cost not included. For hot deck swinging, add move in cost of extra yarder from Table 1. This rigging cost is suggested as a guide. The appraiser should judge each logging situation individually and develop appropriate rigging costs.

Cold Deck

Normally swinging requires no extra yarder. Therefore, no additional move in cost would normally be allowed. However, the appraiser's logging plan may require two yarders and thus an additional move in allowance. This rigging cost is suggested as a guide. The appraiser should judge each logging situation individually and develop appropriate rigging costs.

Basic Data, Appendix 1, Pages 169 & 170

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
RIGGING, YARDING AND LOADING

TABLE 41

COLD DECK SWINGING  
Western Oregon

Costs in Dollars per MBF of Gross Volume Actually Swung

16 Ft. Log Volume Scrib. <u>Dec. C.</u>	<u>Hook and Unhook Cost</u>	<u>Swinging Cost per 100' Swing Distance</u>
20	\$ 10.05	\$ 0.75
30	8.69	0.46
35	7.65	0.46
40	6.63	0.46
45	5.62	0.46
50	5.00	0.46
55	4.29	0.46
60	3.99	0.46
65	3.68	0.15
<u>1/</u> 70	3.40	0.15

1/ In those cases where volumes exceed those listed, use the Hook and Unhook cost for the largest log volume listed.

Basic Data, Appendix 1, Pages 167 & 168

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
RIGGING, YARDING AND LOADING

TABLE 42

COLD DECK LOADING  
WESTERN AND EASTERN OREGON

For Western and Eastern Oregon

Tracked Loader \$1.52/MBF

Rubber-tired Loader \$1.59/MBF

The cost is based on operating cost of a heavy mobile loader operation loading 165 M per eight hour day. (Loader - Track Barko 450 or Rubber-tired Barko 450)

Basic Data, Appendix 1, Pages 171 & 172; ~~173 & 174~~

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
RIGGING, YARDING AND LOADING

TABLE 43

LIGHT MOBILE LOADER RIGGING  
WESTERN AND EASTERN OREGON

Includes: Light mobile Loader - Barko Model 160  
Yarding tractor  
Tractor and loader operators  
Choker setter

Western  
Oregon

First Landing                      \$ 90

1/ Additional Landings        \$ 45 (each)

Move in costs not included. See Table 1 or Table 2 for appropriate move in cost. Move in costs are based upon a move in distance of 35 miles. If negotiated sales are being appraised, actual move in distance should be determined and move in cost adjusted accordingly.

1/ The additional landings are considered to be within less than one half hour loader moving time from preceding landings. Care should be taken to adjust when actual conditions vary from this premise. If negotiated sales are being appraised, moving time between landings may be accurately estimated and cost of additional landings adjusted accordingly. Yarding tractor move in cost (Tables 1 and 2); rigging costs (Tables 18 and 25); and tractor yarding costs (Tables 7A, 7B, 14, 15 and 20).

Basic Data, Appendix 1, Pages 177 thru 180

LIGHT MOBILE LOADER LOADING COSTS

Based on 150/M day -        \$ 1.32

Basic, Data, Appendix 1, Pages 175 and 176



RIGGING, YARDING AND LOADING

TABLE 44

YARDING BY LIGHT YARDER-LOADER  
WESTERN AND EASTERN OREGON  
COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED 1/

16 FT. LOG VOLUME SERIES DEC.C.	YARDING (SLOPE) DISTANCE IN FEET									
	50	100	150	200	250	300	350	400	450	500
4	30.70	31.80	32.95	34.10	35.25	36.40	37.50	38.65	39.80	40.95
6	29.15	30.25	31.40	32.55	33.70	34.85	35.95	37.10	38.25	39.40
8	27.60	28.75	29.90	31.05	32.15	33.30	34.45	35.60	36.75	37.85
10	26.10	27.25	28.40	29.55	30.70	31.80	32.95	34.10	35.25	36.40
12	24.65	25.80	26.95	28.10	29.20	30.35	31.50	32.65	33.80	34.90
14	23.25	24.35	25.50	26.65	27.80	28.95	30.05	31.20	32.35	33.50
16	21.85	22.95	24.10	25.25	26.40	27.55	28.65	29.80	30.95	32.10
18	20.45	21.60	22.75	23.90	25.00	26.15	27.30	28.45	29.60	30.70
20	19.10	20.25	21.40	22.55	23.70	24.80	25.95	27.10	28.25	29.40
22	17.80	18.95	20.10	21.25	22.35	23.50	24.65	25.80	26.95	28.05
24	16.55	17.65	18.80	19.95	21.10	22.25	23.35	24.50	25.65	26.80
26	15.30	16.40	17.55	18.70	19.85	21.00	22.10	23.25	24.40	25.55
28	14.05	15.20	16.35	17.50	18.60	19.75	20.90	22.05	23.20	24.30
30	12.90	14.00	15.15	16.30	17.45	18.60	19.70	20.85	22.00	23.15
32	11.70	12.85	14.00	15.15	16.30	17.40	18.55	19.70	20.85	22.00
34	10.60	11.75	12.85	14.00	15.15	16.30	17.45	18.55	19.70	20.85
36	9.50	10.65	11.75	12.90	14.05	15.20	16.35	17.45	18.60	19.75
38	8.40	9.55	10.70	11.85	13.00	14.10	15.25	16.40	17.55	18.70
40	7.40	8.50	9.65	10.80	11.95	13.10	14.20	15.35	16.50	17.65
44	5.40	6.55	7.65	8.80	9.95	11.10	12.25	13.35	14.50	15.65
48	5.40	5.40	5.80	6.95	8.10	9.25	10.35	11.50	12.65	13.80
52	5.40	5.40	5.40	5.40	6.35	7.50	8.60	9.75	10.90	12.05

1/ IN THOSE CASES WHERE VOLUMES EXCEED THOSE LISTED, USE THE COST OF THE LARGEST LOG VOLUME FOR THE APPLICABLE YARDING DISTANCE.

BASIC DATA, APPENDIX 1, PAGES 183, 184 AND 280

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
RIGGING, YARDING AND LOADING

TABLE 45

LIGHT YARDER LOADER - RIGGING  
WESTERN AND EASTERN OREGON

Includes: Light yarder-loader - Skagit SJ-5R Used Equipment  
3 man logging crew  
Loading engineer  
Choker setter  
Chaser (Knot Bumper)

	<u>Western</u> <u>Oregon</u>	<u>Eastern</u> <u>Oregon</u>
Each Landing	\$67 (each)	\$66 (each)

Move in costs are not included.

LIGHT YARDER LOADER - LOADING  
WESTERN AND EASTERN OREGON  
(Skagit SJ-5R)

(Based on rate of 165 MBF per day)

Loading Cost	\$3.23	per MBF
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Basic Data, Appendix 1, Pages 185 thru 190

RIGGING, YARDING AND LOADING

TABLE 46

YARDING WITH LIGHT CRAWLER TRACTOR - COMMERCIAL THINNINGS  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED

16 FT. SCRIB. LOG VOLUME	YARDING DISTANCE IN FEET 1/ 2/									
	100	200	300	400	500	600	700	800	900	1000
10	83.90	87.40	90.90	94.40	97.90	101.45	104.95	108.45	111.95	115.45
20	42.35	44.10	45.85	47.65	49.40	51.15	52.90	54.65	56.40	58.15
35	24.45	25.45	26.45	27.45	28.45	29.45	30.45	31.45	32.45	33.45
50	17.30	18.00	18.70	19.40	20.10	20.80	21.50	22.20	22.90	23.60
60	14.55	15.15	15.70	16.30	16.90	17.45	18.05	18.65	19.20	19.80
70	12.60	13.10	13.60	14.10	14.60	15.10	15.60	16.10	16.60	17.10
85	10.45	10.90	11.30	11.70	12.10	12.55	12.95	13.35	13.75	14.20
95	9.45	9.85	10.25	10.65	11.05	11.40	11.80	12.20	12.60	13.00
110	8.30	8.65	9.05	9.45	9.80	10.20	10.60	10.95	11.35	11.75
130	7.25	7.65	8.05	8.45	8.85	9.25	9.65	10.05	10.45	10.85
150	6.55	6.95	7.35	7.75	8.15	8.55	8.95	9.35	9.75	10.15
170	6.05	6.45	6.85	7.25	7.70	8.10	8.50	8.90	9.35	9.75
185	5.65	6.05	6.45	6.85	7.30	7.70	8.10	8.50	8.90	9.30
195	5.50	5.90	6.30	6.70	7.15	7.55	7.95	8.35	8.75	9.20
215	5.20	5.65	6.05	6.50	6.90	7.30	7.75	8.15	8.55	9.00
250	4.75	5.20	5.60	6.00	6.45	6.85	7.25	7.65	8.10	8.50
305	4.45	4.90	5.35	5.80	6.25	6.65	7.10	7.55	8.00	8.45
330	4.25	4.65	5.10	5.50	5.95	6.35	6.80	7.20	7.65	8.05

1/ DISTANCE LOGS ACTUALLY TRAVEL FROM CHOKER SETTING POINT TO LANDING.

2/ FOR DISTANCES EXCEEDING 1,000', ADD \$0.45 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX I, PAGES 191, 192, 201 THRU 203

YARDING WITH RUBBER-TIRED SKIDDER - COMMERCIAL THINNINGS  
WESTERN OREGON

COSTS IN DOLLARS PER MBF GROSS VOLUME YARDED

TABLE 47

9353.3 - PRODUCTION COSTS  
(Schedule 20)

RIGGING, YARDING AND LOADING

Illustration 2, Page 53  
(33)

16 FT. SCRIP. LOG VOLUME	YARDING DISTANCE IN FEET 1/ 2/									
	100	200	300	400	500	600	700	800	900	1000
10	55.65	57.55	59.35	61.10	62.75	64.35	65.90	67.35	68.75	70.10
20	28.40	29.30	30.20	31.10	31.90	32.70	33.50	34.20	34.90	35.60
35	16.55	17.05	17.55	18.05	18.55	19.00	19.45	19.85	20.25	20.65
50	12.15	12.60	13.00	13.40	13.80	14.15	14.50	14.85	15.15	15.50
60	10.90	11.35	11.80	12.20	12.60	13.00	13.35	13.70	14.05	14.35
70	10.05	10.50	10.95	11.40	11.80	12.20	12.55	12.90	13.25	13.60
85	8.80	9.25	9.70	10.10	10.50	10.85	11.20	11.55	11.90	12.20
95	8.45	8.90	9.35	9.75	10.15	10.55	10.95	11.30	11.65	11.95
110	7.75	8.20	8.60	9.05	9.45	9.80	10.20	10.55	10.85	11.20
130	7.30	7.75	8.20	8.65	9.05	9.45	9.85	10.20	10.55	10.90
150	7.00	7.50	7.95	8.40	8.80	9.20	9.60	10.00	10.35	10.70
170	6.70	7.15	7.60	8.05	8.50	8.90	9.30	9.65	10.00	10.35
185	6.50	6.95	7.45	7.90	8.30	8.70	9.10	9.50	9.85	10.20
195	6.35	6.85	7.30	7.75	8.20	8.60	9.00	9.35	9.70	10.05
215	6.20	6.70	7.15	7.60	8.05	8.45	8.85	9.20	9.60	9.90
250	6.05	6.55	7.00	7.45	7.90	8.35	8.75	9.15	9.50	9.85
305	5.85	6.35	6.85	7.35	7.80	8.20	8.65	9.05	9.45	9.80
330	5.75	6.30	6.80	7.25	7.70	8.15	8.60	9.00	9.35	9.75

1/ DISTANCE LOGS ACTUALLY TRAVEL FROM CHOKER SETTING POINT TO LANDING.

2/ FOR DISTANCES EXCEEDING 1,000', ADD \$0.35 FOR EACH ADDITIONAL 100' OF YARDING DISTANCE.

BASIC DATA, APPENDIX 1, PAGES 193, 194, 204 THRU 206



9353.3 - PRODUCTION COSTS  
(Schedule 20)  
RIGGING, YARDING AND LOADING

TABLE 48

LOADING - COMMERCIAL THINNINGS  
WESTERN OREGON

(Using Barko - Model 160 as a cold deck loader)

Costs in Dollars per MBF Gross Volume Loaded

16-Foot Log Volume in  
Bd. Ft. Scribner

10	\$ 50.65
20	26.50
40	14.75
50	12.00
60	10.35
70	9.20
90	7.75
100	7.20
110	6.65
120	6.50
130	6.00
140	5.80
150	5.50
160	5.30
170	5.10
190	4.90
200	4.75
210	4.60
220	4.50
230	4.45
240	4.35
260	4.15
280	4.05
290	3.95
300	3.90
330	3.80

Basic Data, Appendix 1, Pages 195, 196, 287 & 288

9353.3 - PRODUCTION COSTS  
(Schedule 20)

RIGGING, YARDING AND LOADING

TABLE 49

COMMERCIAL THINNINGS - RIGGING  
WESTERN OREGON

Includes: 2 light crawler tractors - D4D  
Light loader - Barko Model 160  
2 tractor operators (yarding crew)  
1 man loading crew

First Landing \$ 265

Additional Landings \$ 125 (each)

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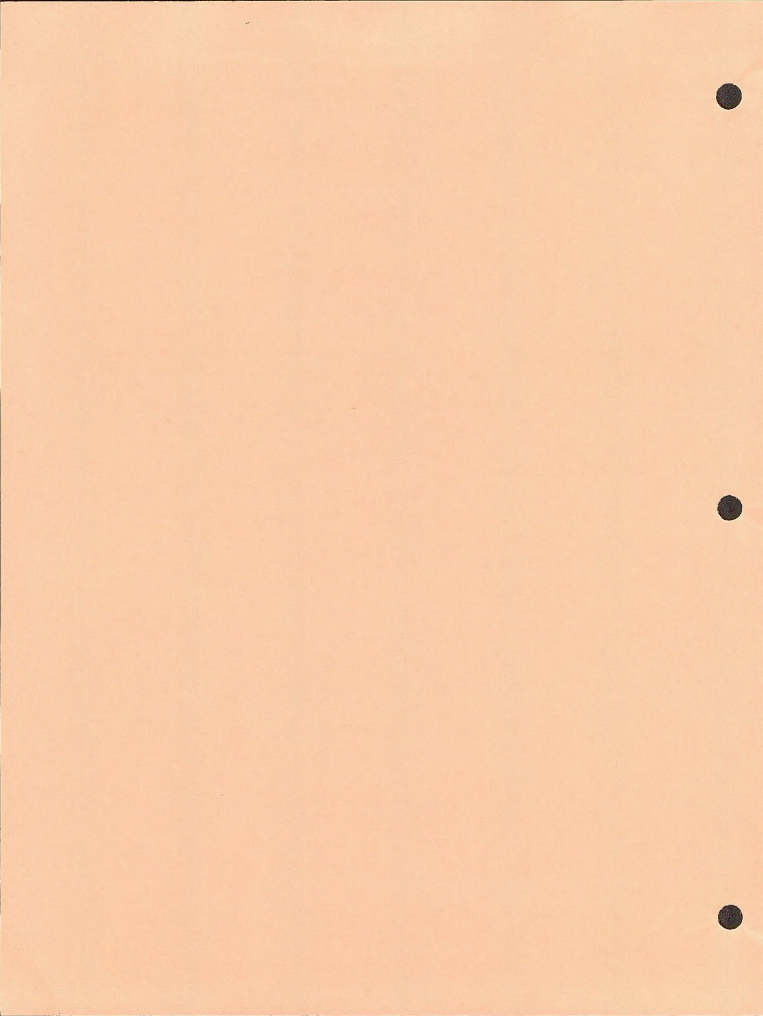
Includes: 2.4-wheel rubber tired skidders - John Deere 440B  
Light loader - Barko Model 160  
2 skidder operators (yarding crew)  
1 man loading crew

First Landing \$ 300

Additional Landings \$ 140 (each)

If landings are more than 1/2 mile apart, allow \$ 55.00 for  
each additional 1/4 mile.

Basic Data, Appendix 1, Pages 197 thru 204



9353.3 - PRODUCTION COSTS  
(Schedule 20)  
TRANSPORTATION

TABLE 1

LOG TRUCK HAULING RATES

(Truck

White - Model 4964 with Peerless Trailer)

Straight Time                      \$ 30.28/hour  
   .505/minute

\* Overtime                              \$32.26/hour  
   .538/minute

Delay Cost                              \$ 20.03/hour  
   .334/minute

\* Overtime rate is straight time plus 50% increase in driver's wage rate.

Basic Data, Appendix 1, Pages 205 thru 208



9353.3 - PRODUCTION COSTS  
(Schedule 20)  
TRANSPORTATION

TABLE 2

"EXAMPLE" - HAULING COST COMPUTATION

- A. Standard Method - Clocked round trip time includes observed delay time. Hauling cost per MBF net volume is derived from the total gross volume hauled per day.

Maximum day (12 hours)-	720 min.
Minus 30 minutes fixed delay time (for engine warmup, truck servicing and fueling) -	-30 min.
Net available operating time -	690 min.

Total mean time/round trip (includes observed dekeys) -	210 RTM
---	---------

Maximum number of trips per day:	
690 min. ÷ 210 total mean RTM = 3.29 trips	
Complete round trips 3.0 @ 210 RTM each -	630 min.
Minus 7-1/2 hours straight time -	-450 min.
Operating overtime -	180 min.

Costing time:

450 minutes	
+30 minutes fixed delay time	
480 minutes x \$0.505/min. straight time <u>1/</u> -	\$242.40
180 minutes overtime x \$0.538 minutes <u>1/</u> -	96.84
Total hauling cost, 3 loads -	\$339.24

No. loads/day 3.0 x 5.300 M bd. ft./gross load =  
15.900 M, total gross volume hauled per day

Total hauling cost/day \$339.24 ÷ 15.900 M gross volume =  
\$21.34/M gross volume hauled

(M total net volume) 2/  
3,213  
3,570 = 0.90 log scale recovery  
(decimal fraction)

(M tot. gr. merch. vol.) 2/3/

Truck haul unit cost = \$21.34/M gross volume ÷ 0.90  
log scale recovery = \$23.71/M net merch. volume

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
TRANSPORTATION

TABLE 2 (Cont')

- B. Alternate Method. The appraiser calculates the maximum number of full round trips (including all delay times) that could be made during a 12-hour day. No fractional trips are considered.

Given an estimated log weight of 10.0 pounds per bd. ft., cruise date indicating a 90 percent log scale recovery, a net volume of 4.770 MBF per load (from Chart 5) and a clocked round trip time of 170 minutes obtained from altimeter and odometer readings:

Clocked round trip time -	170 min.
Allowance for "operating" delays	-40 min.
Total time per round trip -	210 min.
Maximum day (12 hours) 1/ -	720 min.
Minus 30 minutes fixed delay time	-30 min.
Net available operating time -	690 min.

Maximum number of trips per day:

690 minutes	210 minutes/round trip = 3.29 trips
Complete round trips - 3.0 @ 210 min. ea. =	630 min.
Minus 7-1/2 hours straight time (1/2 hr.	
straight time spent in fixed delay) =	-450 min.
Operating overtime -	180 min.

Costing straight time:

450 minutes	
+ 30 minutes fixed delay	
480 minutes x \$0.505/minute 1/	\$242.40

Costing overtime:

180 minutes x \$0.538/minute 1/	96.84
Total hauling cost, 3 loads	\$339.24

Total net volume hauled:

$$3 \text{ loads} \times 4.770 \text{ MBF net/load} = 14.310 \text{ MBF/day}$$

Truck haul unit cost:

$$\$339.24 \div 14.310 \text{ MBF} = \$23.71/\text{MBF net volume}$$

1/ From Table 1, Illustration 3

2/ From timber sale cruise data

3/ Gross volume after elimination of defect removed in falling and bucking

Basic Data, Appendix 1, pages 205 and 208



9353.3 - PRODUCTION COSTS  
(Schedule 20)  
ROAD CONSTRUCTION AND MAINTENANCE

TABLE 1

ENGINEERING COSTS  
WESTERN OREGON

1. Engineering Costs. Engineering costs are not allowed for non-designed roads which require only centerline location and grade established by BLM Allowance for the total job, i.e., survey, design and slope staking is the estimated cost of accomplishing the work or a centerline location previously designated by BLM.

Whenever possible, engineering costs should be obtained from local sources. Reliable contractors capable of performing the required engineering will be contacted and cost allowances applicable to the road being appraised should be discussed and quotes requested for the required work. Several contractors will be contacted (usually no more than three or four) in order to develop reasonable allowances.

When it is not possible to develop reliable allowances from local sources, the following costs may be used as guides in estimating engineering costs.

a. Western Oregon.

(1) Survey and Design.

(a) Survey. Includes P-line traverse, brushing, turning angles, chaining, referencing, running centerline levels and establishing bench marks, cross sectioning, staking and supervision - \$1700/mile

Should it be necessary to itemize any of the details included in the total survey cost, the following unit costs are suggested:

P-Line traverse -	\$715/mile
P-Line profile -	\$275/mile
Cross sections -	\$710/mile

(b) Design. Includes design engineering, data processing, computation of quantities and inspection and supervision - \$650/mile

(2) Slope Staking.  
\$725/mile

(3) Survey, Design and Slope Staking.  
\$3,075/mile



9353.3 - PRODUCTION COSTS  
(Schedule 20)  
ROAD CONSTRUCTION AND MAINTENANCE

TABLE 2

EQUIPMENT MOVE IN <sup>1/</sup>

The basic allowance covers the cost of moving the minimum essential road building equipment from one job to another. A moving distance of 35 miles is considered average. Many loggers presently use two tractors in road construction, one equipped with dozer blade and ripper (without towing winch) and one with dozer blade and towing winch. The latter machine is herein considered a logging tractor; its moving cost is excluded from the road construction move in cost allowance. If it is anticipated that additional equipment (wheel scraper, shovel, roller, dump truck, loader) will be used, the basic road construction move-in allowance must be increased accordingly.

Basic Road Construction Move-In - \$1030.00

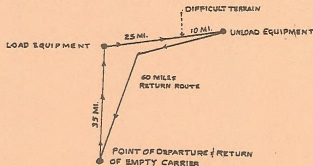
Includes: Tractor Mounted Dozer D8H - Separate Move-in at - \$760.00  
Compressor and Track Drill - " " - \$190.00  
Motor Grader - " " " - \$ 75.00

Additional Equipment:	Wheel Scraper	\$285.00
	3/4 Yard Shovel	\$305.00
	Grid Roller	\$240.00
	Vibratory Roller	\$145.00
	Dump Truck	\$ 75.00
	Light (Misc.) Tractor	\$235.00
	Front End (Bucket)	
	Loader, Rubber-tired	\$145.00

1/ Move in costs were computed for these conditions:

- (1) The equipment will be actually moved 35 miles
- (2) The empty truck rate is allowed for 60 miles
- (3) Travel over mountainous or difficult terrain - 10 miles

An example is:



The additional empty distance is used because many small communities which furnish manpower for logging do not have commercial hauling equipment capable of handling cats, etc. These have to be obtained from sources farther away.

Basic Data, Appendix 1, Pages 209 thru 230

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
ROAD CONSTRUCTION AND MAINTENANCE

TABLE 3

CLEARING AND GRUBBING

GRUBBING COSTS

<u>D.B.H.</u>	<u>Cost in Dollars</u> <u>per Stump</u>
24	\$ 7.90
28	9.90
32	12.00
36	15.80
40	19.70
44	23.55
48	27.45
52	31.30
56	35.20
60	39.15
64	43.00
68	46.85
72	50.75
76	54.60
80	58.55
84	62.35
88	66.30
92	70.20
96	74.05
100	78.00

CLEARING COST

Total cost of clearing per surface acre - \$673.00

Basic Data, Appendix 1, Pages 231, 232 & 289

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
ROAD CONSTRUCTION AND MAINTENANCE

TABLE 4

EXCAVATION COSTS PER CUBIC YARD <sup>1/</sup>  
COMMON EXCAVATION

Weighted average cost, all studies- \$0.25 per yard

<sup>1/</sup> See Tables 9 and 10 for drift cost adjustments and end haul costs.

Basic Data, Appendix 1, Pages 290 and 291

ROCK EXCAVATION

Weighted average cost, all studies, all side slopes - \$1.95/yd.

Basic Data, Appendix 1, Pages 292 and 293

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
ROAD CONSTRUCTION AND MAINTENANCE

TABLE 5

EXCAVATION COST PER STATION  
14 FOOT SUBGRADE (10 FFOT USABLE WIDTH)

% Side Slope	COMMON EXCAVATION			ROCK EXCAVATION		
	Cost/ Station	Avg, Cut at Center Line-Ft.	Avg. Cu. Yards/ Station	Cost/ Station	Avg. Cut at Center Line-Ft.	Avg.Cu. Yards/ Station
0	\$ 23.65	1.0	93	124.80	1.0	64
10	23.65	1.0	93	124.80	1.0	64
20	37.35	1.5	147	167.70	1.0	86
30	55.90	2.0	220	187.20	1.5	96
40	81.55	2.7	321	378.30	2.3	194
50	94.00	2.7	370	512.85	2.6	263
60	123.20	4.3	485	766.35	4.2	393
70	158.00	5.0	622	922.35	4.9	473
80	193.80	5.7	763	1109.55	5.7	569
90	230.40	6.3	907	1244.10	6.2	638
100	287.80	7.0	1133	1433.25	7.0	735

Basic Data, Appendix 1, Pages 290 thru 293



9353.3 - PRODUCTION COSTS  
(Schedule 20)  
ROAD CONSTRUCTION AND MAINTENANCE

TABLE 6

EXCAVATION COSTS PER STATION  
20 FOOT SUBGRADE (12 FOOT USABLE WIDTH)

% Side Slope	COMMON EXCAVATION			ROCK EXCAVATION		
	Cost/ Station	Ave. Cut at Center Line-Ft.	Ave.Cu. Yards/ Station	Cost/ Station	Avg. Cut at Center Line-Ft.	Avg.Cu. Yards/ Station
0	\$33.05	1.2	130	\$ 144.30	0.7	74
10	33.05	1.2	130	144.30	0.7	74
20	78.50	2.5	309	232.05	1.0	119
30	87.90	2.5	346	401.70	1.5	206
40	117.35	3.0	462	538.20	2.0	276
50	156.70	4.3	617	992.55	4.3	509
60	199.65	5.0	768	1164.15	5.0	597
70	276.35	7.0	1088	1678.95	7.0	861
80	338.10	8.0	1331	1930.50	8.0	990
90	415.55	9.0	1636	2301.00	9.0	1180
100	519.45	10.0	2045	2603.25	10.0	1335

Basic Data, Appendix 1, Pages 290 thru 293

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
ROAD CONSTRUCTION AND MAINTENANCE

TABLE 7

EXCAVATION COSTS PER TURNOUT  
14 FOOT SUBGRADE (10 FOOT USABLE WIDTH) 1/

% Side Slope	COMMON EXCAVATION			ROCK EXCAVATION		
	Cost/ Turnout	Avg. Cut at Center Line-Ft.	Avg. Cu. Yards/ Turnout	Cost/ Turnout	Avg. Cut at Center Line-Ft.	Avg. Cu. Yards/ Turnout
0	\$ 7.10	1.3	28	\$ 50.70	1.3	26
10	7.10	1.3	28	50.70	1.3	26
20	8.15	2.0	32	103.25	2.0	53
30	12.45	2.7	49	197.00	2.8	101
40	13.45	3.5	53	138.45	3.5	71
50	21.85	4.7	86	206.70	4.7	106
60	79.00	8.0	311	461.70	8.0	255
70	171.20	12.0	674	970.70	12.0	509
80	208.80	13.2	822	1146.60	13.8	588
90	262.15	14.8	1032	1368.90	15.0	702
100	316.25	17.0	1245	1618.50	17.0	830

1/ Standard lengths: 50 foot turnout plus two 25 foot approaches.

Basic Data, Appendix 1, Pages 290 thru 293

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
ROAD CONSTRUCTION AND MAINTENANCE

TABLE 8

EXCAVATION COSTS PER TURNOUT  
20 FOOT SUBGRADE (12 FOOT USABLE WIDTH)<sup>1/</sup>

% Side Slope	COMMON EXCAVATION			ROCK EXCAVATION		
	Cost/ Turnout	Avg. Cut at Center Line-Ft.	Avg. Cu. Yards/ Turnout	Cost/ Turnout	Avg. Cut at Center Line-Ft.	Avg. Cu. Yards/ Turnout
0	19.55	1.7	77	243.75	1.0	125
10	19.55	1.7	77	243.75	1.0	125
20	26.40	3.0	104	356.85	2.5	183
30	30.22	3.1	119	372.45	3.1	191
40	52.60	4.0	207	466.05	4.0	239
50	54.10	5.7	213	407.55	5.6	209
60	269.00	10.1	1059	1700.40	10.1	872
70	436.40	14.0	1718	2560.35	14.0	1313
80	547.10	16.0	2154	3120.00	16.0	1600
90	674.35	18.0	2655	3502.20	18.0	1796
100	794.50	20.0	3128	4093.05	20.0	2099

<sup>1/</sup> Standard lengths: 100 foot turnout plus two 50 foot approaches.

Basic Data, Appendix 1, Pages 290 thru 293

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
ROAD CONSTRUCTION AND MAINTENANCE

TABLE 9

ALLOWANCE FOR DRIFT BEYOND 100 FEET

<u>Average Drift Distance in Feet</u> <sup>1/</sup>	<u>Cost Increase in Per Cent</u> <sup>2/</sup>	<u>Adjusted Cost</u> <sup>3/</sup> <u>per Cubic Yard</u>
100	0	\$ 0.25
150	42	0.36
200	79	0.45
250	127	0.58
300	178	0.71
350	213	0.80

<sup>1/</sup> Distance from mass center of cut to mass center of fill.

<sup>2/</sup> These percentages apply only to tractor cost and not to drilling, blasting or explosive costs.

<sup>3/</sup> With basic common excavation cost of \$0.254 per yard.

Basic Data, Pages 290 and 293



TABLE 10

EXCAVATION AND END HAUL COSTS <sup>1/</sup>

Wheel Tractor Hauling Unit (scraper) and Pusher Tractor

<u>Length of Haul in Feet</u>	<u>Cost per Cubic Yard</u>
500	\$ 0.68
1000	0.87
1500	1.03
2000	1.22
2500	1.38

1/ Allow wheel scraper move in cost when using this table.

Basic Data, Appendix 1, Pages 233, 234, 294 & 295

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
ROAD CONSTRUCTION AND MAINTENANCE

TABLE 11

SHOVEL EXCAVATION COSTS <sup>1/</sup>

<u>Type of Material</u>	<u>Cost per Cubic Yard</u>
Easy Digging (common earth - no rocks or roots) -	\$ 0.61
Rock, Well Blasted -	0.88
Common Excavation (with rocks and roots intermingled) -	1.05
Rock, Poorly Blasted -	1.63

1/ Allow 3/4 yard shovel move in cost when using this table. Shovel excavation will normally be used only in problem areas.

Basic Data, Appendix 1, Pages 235, 236 & 296

TABLE 12

SHOVEL LOADING - BANK TO TRUCK 1/

<u>Material</u>	<u>Cost per Loose Cubic Yard - on Truck <u>2/</u></u>
Bank run (material in place)	\$ 0.53

1/ Allow 3/4 yard shovel move in and dump truck move in costs when using this table.

2/ Cost is adjusted for swell from bank cubic yards to loose cubic yards.

Basic Data, Appendix 1, Pages 237 & 238

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
ROAD CONSTRUCTION AND MAINTENANCE

TABLE 13

STANDARD RIVETED ROUND PIPE

(1)		(2)			(3)		
Size	Gage	Delivered Price/ft.	Connecting Bands Based on 36' each	Pipe L./ft	Beveled Based on 36' Pipe L. each Per foot	Shop Elliptical Forming	Total Cost/ Instal- lation foot
18"	16	\$ 4.65	\$ 7.25	\$ 0.20			\$ 3.64 \$8.49
21"	16	5.30	7.50	0.21			4.10 9.61
24"	14	7.39	8.40	0.23			4.68 12.30
30"	14	9.00	10.10	0.28			5.98 15.26
36"	12	14.93	12.70	0.35		\$ 1.50	7.02 23.80
42"	12	17.77	15.50	0.43		1.75	8.32 28.27
48"	12	20.05	17.10	0.48	\$19.00	\$ 0.53 2.00	10.30 33.36
54"	12	25.59	21.80	0.61	23.00	0.64 2.25	12.01 41.10
60"	10	37.47	23.70	0.66	26.00	0.72 2.45	13.42 54.72
66"	10	40.98	76.75	2.13	30.00	0.83 2.70	15.18 61.82
72"	10	44.59	83.30	2.31	33.00	0.92 3.00	16.59 67.41
78"	8	60.90	96.85	2.69	38.00	1.06 3.50	18.62 86.77
84"	8	67.20	104.60	2.91	44.00	1.22 3.50	21.16 95.99
90"	8	71.94	112.05	3.11	50.00	1.39 3.50	23.76 103.70
96"	8	76.91	119.35	3.32	60.00	1.67 4.00	26.88 112.78

(1) Prices as of 4-26-77

(2) 18" Pipe - 7" band  
21" to 60" Pipe - 12" band  
66" and over Pipe - 24" band

(3) Based on Backhoe installation and average conditions. (1 1/2 dia. common excavation)



9353.3 - PRODUCTION COSTS  
(Schedule 20)  
ROAD CONSTRUCTION AND MAINTENANCE

TABLE 14

STANDARD RIVED PIPE ARCH

Size	Gage	(1) Delivered	Connecting Bands (2) Based on 36'		(3)	Total Cost/Ft.
		Price /Ft.	each	Pipe L./Ft.	Installation	
21" x 15"	16	\$ 4.97	\$ 7.80	\$ 0.22	\$ 3.90	\$ 9.09
24" x 18"	16	5.63	8.10	0.23	4.50	10.36
28" x 20"	14	7.76	8.95	0.25	5.20	13.21
35" x 24"	14	9.39	11.00	0.31	7.02	16.72
42" x 29"	12	15.42	13.50	0.38	7.80	23.60
49" x 33"	12	18.34	15.60	0.43	9.36	28.09
57" x 38"	12	20.66	17.55	0.49	12.32	33.47
64" x 43"	12	26.28	20.40	0.57	14.87	41.72
71" x 47"	10	38.32	24.30	0.68	16.63	55.63

- (1) Prices as of January 1977.
- (2) Pipes up to 50" - 12" Band  
Pipes over 50" - 24" Band
- (3) Based on Backhoe installation and average conditions  
(1 1/2 diameter common excavation)

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
ROAD CONSTRUCTION AND MAINTENANCE

TABLE 15

16 GAGE HALF-ROUND

2 Man Hours

Size	Delivered Cost /Ft.	4 Posts-Chain Belts	Installation	Total Cost/Ft.
21"	\$ 3.47	\$ 1.00	\$2.80 <u>1/</u>	\$ 7.30
24"	4.84	1.00	3.30	9.15
30"	5.89	1.00	3.80 <u>2/</u>	10.70

1/ Installation based on two man hours per 10 ft. length

2/ Installation based on three man hours per 10 ft. length

9353.3 - PRODUCTION COSTS  
(Schedule 20)

ROAD CONSTRUCTION AND MAINTENANCE

TABLE 16

LARGE ROUND PIPE AND PIPE ARCHES

These structures are usually designed and require costs specific to the situation. Costs may vary by locality. Therefore, costs should be obtained locally.

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
ROAD CONSTRUCTION AND MAINTENANCE

TABLE 17

COST OF PERFORATED CULVERT PIPE  
(PLAIN GALVANIZED)

<u>Size</u>	<u>Gage</u>	<u>Installed Cost <sup>1/</sup> per Foot</u>
8"	16	\$ 5.00

1/ Price Obtained From ARMCO, Portland, Oregon  
4/27/77



9353.3 - PRODUCTION COSTS  
(Schedule 20)  
ROAD CONSTRUCTION AND MAINTENANCE

TABLE 18

GRADING (Per 100' Station)

This is based on the use of a motor grader and the time required for finishing the subgrade and pulling the ditch or subgrades up to 20 feet in width, exclusive of ditch.

Grading cost per 100 foot station - \$ 7.71

Basic Data, Appendix 1, Pages 239 & 240

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
ROAD CONSTRUCTION AND MAINTENANCE

TABLE 19

Surfacing Costs

1. Rock.

A. Purchased Rock. Cost estimates for commercially produced crushed rock shall be obtained from local sources. Reliable contractors producing appropriate grade and type of rock in quantities required shall be contacted and price quotes requested specific to the road being appraised. Several contractors should be contacted in order to develop reasonable allowances. The "total job" quote, i.e., cost of rock in place, should be obtained whenever possible. If a "total Job" quote cannot be obtained, additional costs such as hauling, spreading, etc., should be obtained from other independent local contractors; from following cost tables; or calculated for the specific road using operating cost data from the appendix.

B. Operator Produced Rock. Cost estimates for operator produced rock shall be based on localized district costs. The variation in rock source and quality precludes the use of a single cost estimate to accurately reflect the conditions in all districts. The District/ Appraiser and the District Engineer shall compile complete road surfacing costs based on the best local experience available and these costs will be updated annually. Care must be used to insure that the cost estimates received from local contractors are reasonable and in agreement with other contractors cost estimates. The appraiser should remember that surfacing cost estimates obtained from contractors and operators will contain an allowance for profit and risk. State Office Appraisal and Engineering personnel will check the district surfacing cost estimates annually to insure completeness and accuracy.

C. Pit and Bar Run Rock. Cost estimates for this type of material should be developed for the specific road using local equipment rental rates and production rates. When applicable the appraiser may use the following shovel loading cost table.

Pit and Bar Run (cost of shovel loading) <u>1/</u>	- \$0.53/cu.yd.
2. <u>Loading</u> (from stockpile) <u>2/</u>	- \$0.44/cu.yd.
3. <u>Hauling Rock.</u> <u>3/</u>	
First mile or fraction thereof -	\$1.18/cu.yd.
Each additional mile beyond first mile -	\$0.53/cu.yd.

(.35) 9353.3 - PRODUCTION COSTS  
(Schedule 20)

ROAD CONSTRUCTION AND MAINTENANCE

TABLE 19 (cont')

4. Spreading Rock. (cost per life) 4/ \$1.65/Station

5. Rolling Rock. 5/ 6/

Vibratory roller and crawler tractor	\$48.38/hr
Vibratory roller and rubber tired tractor	\$60.63/hr.
Grid roller and crawler tractor	\$42.44/hr.

6. Watering. 7/

Costs vary considerably, depending on quantity of water, water source, topography, and other elements.

The following costs include haul, source preparation, loading, spreading, and equipment costs.

Crushed graded rock \$0.35 to \$0.40 per C.Y. (50 Gal/C.Y.)

1/ Based on OSHD rental rate of 3/4 cu. yd. power shovel - add appropriate move in costs for shovel. Dump truck costs not included.

2/ Based on rental rate of front end loader. Dump truck costs not included.

3/ Based on OSHD rental rate for normal size 10 cu. yd. (Struck measure) dump truck primarily for small operations. Costs will be significantly less for large hauling shows which would provide for more efficient loading and hauling of larger trucks.

4/ Based on ownership rate of Motor Grader - add appropriate move in costs, unless previously allowed under construction equipment move in.

5/ Based on OSHD rental rate for rollers and rubber tired loader. Ownership rates for towing tractor add appropriate move in costs for rollers and power units if not previously allowed.

6/ Suggested production rate is 100 cu.yd. per hour of rolling. Appraiser should judge each situation individually and estimate accordingly.

7/ Usual range is 45 to 55 gallons per cu.yd. Appraiser should judge each situation individually and estimate accordingly. Information obtained and adjusted from U.S.F.S. Cost Estimating Guide for Road Construction., Zone 5.

Basic Data, Appendix 1, Pages 241, 243 thru 250



9353.3 - PRODUCTION COSTS  
(Schedule 20)  
ROAD CONSTRUCTION AND MAINTENANCE

Table 20

ROAD MAINTENANCE  
(BLACKTOP AND GRAVEL ROADS)

The standard road maintenance special provision under Section 41 of timber sale contracts requires the purchaser to maintain the cross section of dirt or graveled roads as presently existing or where applicable, to the reconstructed standards required by the contract by accomplishing the following items:

1. Grader work - grading, pulling ditches, and slough removal.
2. Loader work - slough removal and cut and fill repair with limited end hauling. (Not involving the use of dump trucks).
3. Backhoe work - catch basin work and culvert work.
4. Hand work - culvert cleaning.

Additional maintenance requirements such as dust abatement, brush trimming, spot surfacing, etc., must be added to the road maintenance special provision in Section 41. Adequate allowance must be made in the appraisal for these added maintenance requirements.

Any work necessary to bring the existing road into shape for the above maintenance should be classified as renovation or road improvement and be a requirement of Exhibit C of the contract. Separate allowance in the appraisal must be made for this work.

Renovation when it is determined by the Area Manager that maintenance required is above what can be accomplished by Section 41, renovation will be specified. Renovation is defined as work that will raise the existing road standard toward but not beyond its original condition. It would include blading, ditching, slide removal, culvert cleaning or replacement, remulching, etc. and shall bring the road up to a standard that is maintainable under Section 41 of the contract.

To determine the extent of renovation that is needed, a condition survey must be made of the road, which will determine types of equipment required and rates per station can be established for allowances.

Road Improvement is defined as work that will improve an existing road to a standard higher than that of its original construction. It also must be to a standard maintainable under Section 41 of the contract.



9353.3 - PRODUCTION COSTS  
(Schedule 20)

Table 20 (Cont'd)

1. Surface Road Costs. This represents an average cost of BLM Force Account maintenance, including current work. Amortization of surface replacement (wear) costs should be based upon current State Office instructions, Present allowances follow:

- |    |                                   |                       |
|----|-----------------------------------|-----------------------|
| a. | <u>Blacktop Roads.</u>            |                       |
|    | Average maintenance -             | \$0.113/M/Mile        |
|    | Surface wear -                    | 0.136/M/Mile          |
|    | Total                             | <u>\$0.249/M/Mile</u> |
| b. | <u>Gravel Roads.</u>              |                       |
|    | Average maintenance -             | \$0.157/M/Mile        |
|    | Surface wear - (Fee used x 1.511) | <u>Revised Fee</u>    |
|    | Total                             |                       |

2. Unsurfaced Road Costs. - This allowance should be sufficient to cover surface blading, ditch and culvert cleaning, slough removal and incidental work. It should not include cost of removal of major slides, heavy brush eradication or other extraordinary work.

- a. Unsurfaced Roads - \$0.125/M/Mile maintenance fees unless, the district has more recent updated fees.

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
FIRE PROTECTION AND FUEL TREATMENT

TABLE 1

FIRE PROTECTION - BY SIZE OF TRACT

Timber Sale Size	With Portable Pump	With Trailer Mounted Pump	With Truck Mounted Pump
Up to 3 MM bd. ft.	\$0.29/M bd.ft.	\$0.40/M bd.ft.	\$0.47/M bd.ft.
3 MM to 8 MM bd. ft.	\$890.00 plus \$0.07/M bd.ft.	\$890.00 plus \$0.18/M bd.ft.	\$890.00 plus \$0.24/M bd.ft.
8 MM bd. ft. and larger	\$2,347.00	\$3,189.00	\$3,742.00

Basic Data, Appendix 1, Pages 251 thru 264

9353.3 PRODUCTION COSTS  
(Schedule 20)  
FIRE PROTECTION AND FUEL TREATMENT

TABLE 2

FIRE LINE COSTS  
WESTERN OREGON

<u>Cost/Mile</u>	<u>Low</u>	<u>Medium</u>	<u>High</u>
TRACTOR	\$400	\$860	\$1500
HAND	\$1100	\$2200	\$4300

PILING COSTS  
WESTERN OREGON

<u>Cost/Acre</u>	<u>Low</u>	<u>Medium</u>	<u>High</u>
MACHINE	\$75	\$95	\$155
HAND	\$180	\$217	\$280

BURNING COSTS  
WESTERN OREGON

<u>Cost/Acre</u>	<u>Low</u>	<u>Medium</u>	<u>High</u>
BROADCAST	\$100	\$170	\$260
PILE	\$24	\$72	\$190

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
FIRE PROTECTION AND FUEL TREATMENT

TABLE 3

FIRE LINE COSTS  
EASTERN OREGON

<u>Cost/Mile</u>	<u>Low</u>	<u>Medium</u>	<u>High</u>
TRACTOR	\$100	\$250	\$350
HAND	\$500	\$800	\$1300

PILING COSTS  
EASTERN OREGON

<u>Cost/Acre</u>	<u>Low</u>	<u>Medium</u>	<u>High</u>
MACHINE	\$ 50	\$60	\$80
HAND	\$ 80	\$150	\$300

BURNING COSTS  
EASTERN OREGON

<u>Cost/Acre</u>	<u>Low</u>	<u>Medium</u>	<u>High</u>
BROADCAST	\$50	\$130	\$230
PILE	\$10	\$20	\$50





9353.3 - PRODUCTION COSTS  
(Schedule 20)  
OTHER ALLOWANCES

TABLE 1 (Reserved)



9353.3 - PRODUCTION COSTS  
(Schedule 20)  
WESTERN AND EASTERN OREGON MANUFACTURING

TABLE 1

WEIGHTS BY MANUFACTURE  
(West Side Douglas-fir Only)

Implemented: March 25, 1977

<u>Log Grade</u>	<u>Percentage</u>	
	<u>Sawn</u>	<u>Peeled</u>
No. 1 & No. 2 Peeler	50	50
No. 3 & No. 4 (SP) Peeler	50	50
No. 2 Sawlog	50	50
No. 3 Sawlog	80	20



9353.3 - PRODUCTION COSTS  
(Schedule 20)

WESTERN AND EASTERN OREGON MANUFACTURING

TABLE 2

THINNINGS - MANUFACTURING COSTS

Implemented: March 22, 1977

West Side Douglas-fir	\$67.30
Hemlock	\$70.75
True Firs	\$72.85

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
APPENDIX 1 - BASIC DATA

TREE TO POND COSTS

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9353.3 PRODUCTION COSTS  
(Schedule 20)  
Cost And Production Studies

A. Wage Rates and Manpower

1. Data Source. Wage and rate data was obtained from: Timber Operators Council Inc. 6825 S.W. Sandburg Street, Tigard, Oregon 97223. Those rates include 1975 wage increases made as a result of the negotiated settlements extending over the ensuing two year period (June 1, 1975 to May 31, 1977) for union and non-union operations in both western and eastern Oregon.

a. Adjustment Factors. (Western Oregon) Basic wage rates are adjusted to at total of 190% according to the following factors to provide the total adjusted wage rate.

(1) Workmen's Benefits. The basis for workmen's benefits was obtained from the General Pattern of Industry-Wide Wage and Fringe Benefits compiled by the Timber Operators Council Inc. Health & Welfare, Pensions, Hoot Owl Pay Differential and Travel Pay Differential were fixed dollar per hour amounts for all positions. The percentage of basic rate for these benefits was determined from the overall average basic rate for all positions. Health and welfare amounted to 58¢/hr. or 8.1%. Pensions were 33¢/hr. or 4.6%. Ten paid holidays and a 15 day paid vacation period were provided. The percentage of the basic rate for those two benefits was determined from the total available time (200 days per year) for 12.5%. The hoot owl pay differential is 18¢/hr. 1/3 of the time for 6¢/hr. or .8%. The total is 26%.

(2) Direct Supervision. This adjustment factor was increased from 10% to 13.5%. The basis for this increase was current estimates from Industry and U.S. Forest Service. The emphasis on environmental protection measures is reflected in this increase.

(3) Employer Contributions.

(i) Unemployment compensation of 3.8% was used. A Federal FUTA tax rate of .5% was applied.

(ii) The Industrial Accident rate was based on an average for Western Oregon Logging Industry. The present rate is \$28.62 per \$100 of straight-time payroll. A rate increase of 12.5% occurred September 1, 1976. The rate of 32.2% is modified by a dividend of 13%. The net average rate is 28%.

(iii) Social Security tax rate is currently 5.85% for the first \$15,300 annual earnings. The overall average for all crew members in this schedule does not exceed this amount. The full tax rate is provided.

9353.3 PRODUCTION COSTS  
(Schedule 20)

(4) Transportation and Travel. This cost item is included under wage rates to simplify the job of computing hourly operating rates. The item includes a travel differential of 35¢/hr. for all crew members, except the log-truck driver, and a transportation cost of 51¢/hr. The 86¢/hr. cost is 12% of the average basic rate.

b. Adjustment Factors. (Eastern Oregon) Basic wage rates were adjusted according to the following factors to allow for dependent wage costs:

(1) Workmen's Benefits.

(i) Health and welfare	\$0.58
(ii) Paid holidays	0.33
(iii) Paid vacations	0.50
(iv) Pensions	0.33
(v) Hoot owl Differential	0.06
	\$1.80

(2) Direct Supervision. 13.5 percent of base wages of crew was used.

(3) Employer's Contributions - Western and Eastern Oregon.

(i) Unemployment compensation	3.80%
(ii) Industrial accident	28.00%
(iii) Social security	5.85%
(iv) FUTA	.50%
	Total of base wages of crew = 38.15%

(4) Transportation and Travel. Transportation was included under wage rates to simplify the problem of working up the hourly rate of the different functions. The machine rate for a carryall was computed and divided by an average of six riders. A travel differential of 35¢/hr. for all crew members except the log truck drivers was included.

(i) \$0.86 per man hour



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(Schedule 20)

2. Hourly Wage Rate - Western Oregon. The 1972 wage rate survey reported it was more common for logging and road construction crews to work 9-hour days rather than 8-hour days. The ninth daily working hour or the five hours in excess of 40 working hours is usually paid overtime. Thus, this schedule now provides for a basic 9-hour (8 regular time plus one overtime) working day. Even where daily production is based on 8 working hours; wages are allowed in reference to 9-hour days. The overtime for the ninth hour is 1.5 times basic pay level, adjusted for workmen's benefits (except paid holidays and vacations), general supervision, and employer's contributions. There are no allowances for transportation, travel or call time in overtime rates.

In some localities, notably western Medford District, it was reported common for daily work hours to exceed even more than 9 hours. Although a trend was reported, the survey was not adequate to provide for further individual sale basis, and when in the judgment of the appraiser a longer or shorter work day is appropriate, adjustments for overtime should be made. The following factors should be used.

<u>Factor</u>	<u>Work Day - Hours</u>
.97	9 - 8
.99	9 - 8 1/2
1.01	9 - 9 1/2
1.02	9 - 10
1.03	9 - 10 1/2
1.04	9 - 11

Care must be exercised to adjust only the manpower allowance in each logging or road construction activity.



9353.3 - PRODUCTION COSTS  
(Schedule 20)

Wage Rate Summary - Western Oregon

<u>Logging Crew</u>	<u>Basic Wage Per Hour</u>	<u>BLM Adjusted Wage</u>		<u>Schedule 20 BLM Adjusted Wage Based on 9-hr. day</u>	
		<u>Per Hour</u>		<u>Per Hour</u>	<u>Per Min.</u>
		<u>Straight Time</u>	<u>Over Time</u>		
Chaser	\$6.55	\$12.44	\$13.46	\$12.55	\$0.209
Choker Setter	6.38	12.12	13.11	12.23	0.204
Drill Operator	7.17	13.62	14.73	13.74	0.229
Dump Truck Operator	6.50	12.35	13.36	12.46	0.208
Faller & Bucker	8.90	16.91	18.29	17.06	0.284
Grader Operator	6.98	13.26	14.34	13.38	0.223
Head Rigger	7.34	13.95	15.08	14.07	0.234
Hook Tender	7.61	14.46	15.64	14.59	0.243
Loading Engineer	7.18	13.64	14.75	13.76	0.229
Log Truck Driver <u>1/</u>	6.53	11.62	13.42	11.82	0.197
Powder Man	6.56	12.46	13.48	12.57	0.209
Rigging Slinger	7.13	13.55	14.65	13.67	0.228
Shovel Operator	7.33	13.93	15.06	14.05	0.234
Tractor Operator(lg)	7.51	14.27	15.43	14.40	0.240
Tractor Operator(sm)	7.21	13.70	14.82	13.82	0.230
Yarder Engineer	7.42	14.10	15.25	14.23	0.237
Ave. Crew Position	7.13	13.52	14.67	13.65	0.227

1/ Furnishes own Transportation

<u>Summary of Adjustments</u>	<u>Straight Time</u>	<u>Overtime (over 8 hr.)</u>
Workman's Benefits	26.00%	13.00%
Direct Supervision	13.50%	13.50%
Employers Contributions	38.15%	10.15%
Transportation and Travel	<u>12.00%</u>	<u>- -</u>
Total	90%	37%

9353.3 - PRODUCTION COSTS  
(Schedule 20)

. Wage Rate Summary - Eastern Oregon

<u>Logging Crew</u>	<u>Basic Wage</u>		<u>BLM Adjusted Wage</u>		<u>Schedule 20</u>	
	<u>Per Hour</u>	<u>Per Hour</u>	<u>Per Hour</u>	<u>Over Time</u>	<u>BLM Adjusted Wage</u>	
					<u>Based on 9-hr.day</u>	
			<u>Straight Time</u>	<u>Over Time</u>	<u>Per Hour</u>	<u>Per Min.</u>
Chaser	\$6.04		\$11.54	\$12.50	\$11.65	\$0.194
Choker Setter	6.08		11.61	12.58	11.72	0.195
Drill Oper.(Air Track)	7.09		13.54	14.68	13.67	0.228
Dump Truck Driver	6.17		11.78	12.77	11.89	0.198
Faller Bucker	7.81		14.92	16.17	15.06	0.251
Fire Patrol	5.65		10.79	11.69	10.89	0.181
Grader Operator	6.56		12.53	13.58	12.65	0.211
Loader Operator	7.44		14.21	15.40	14.34	0.239
Log Truck Oper. 1/	6.42		11.49	13.29	11.69	0.195
Powder Man	6.12		11.68	12.67	11.79	0.196
Rubber Tired Skid,Oper.	6.87		13.12	14.22	13.24	0.221
Shovel Oper.(Constr.)	7.55		14.42	15.63	14.55	0.242
Tractor Dozer Oper.	6.97		13.31	14.43	13.43	0.224
Avg. Crew Position	6.67		12.74	13.81	12.86	0.214

1/ Furnishes own Transportation

<u>Summary of Adjustments</u>	<u>Straight Time</u>	<u>Overtime(over 8 hrs.)</u>
Workman's Benefits	27.00%	14.00%
Direct Supervision	13.50%	13.50%
Employers Contributions	38.15%	10.15%
Transportation and Travel	<u>12.00%</u>	<u>- -</u>
Total	91%	38%

9353.3 - PRODUCTION COSTS  
(Schedule 20)

B. Machine Rates

The basic cost information in these rate schedules is of special interest to the field appraiser whenever he finds reason to believe the cost tables in this schedule are not representative of conditions for the individual tract being appraised. The basic cost data will provide information to make adjustments in allowances to compensate for special or unusual conditions. Care must be taken that the cost information is applied in the context and manner in which it was compiled.

1. Data Source.

a. Machine Ownership. Information on basic machine costs and operations was obtained from a statewide survey of sample forest industry companies, both large and small, as well as business firms who supply equipment and related supplies. Limited information was obtained from local governments on machine ownership and maintenance costs. Local BLM district surveys were made in an attempt to identify the type of equipment most commonly found in the woods for logging shows similar to BLM timber sales. Rates on property taxes were solicited from local county tax offices and insurance rates were obtained from local insurance firms who commonly write coverage for logging and road construction operators. There are no extensions of costs for anticipated future increases or decreases in any machine rates.

9353.3 - PRODUCTION COSTS  
(Schedule 20)

b. Machine Rental. Rental rates included in the schedule were obtained from: Oregon State Highway Division

Rental Rates For Equipment (without operators)  
Used on Force Account Work (without operators)

Rental rates are applied to equipment which the "average operator" does not normally own. This is not to say all ownership equipment is commonly owned by all operators. For example, an average logger may not own a variety of road building machines; however, he may commonly subcontract road building to construction companies who would own such equipment. It is assumed on integrated logging contractor or typical timber industry operator would usually only rent the types of machines for which rental rates have been used.

Rental rates for the type of equipment in this category should be obtained from local sources; when such machines are available in the area of the appraisal, and when rates appear to be substantially different than the OSHD schedule. Appraisers should not allow rates in excess of those included in this schedule unless it can be substantiated such equipment is not readily available at the established rate. Ownership and rental rates are included for the motor grader. Ownership rates are appropriate for initial road construction; rental rates should be considered for road maintenance, during and after logging. Rental rates for machines not listed in the schedule must be obtained from local sources.



9353.3 - PRODUCTION COSTS  
(Schedule 20)

2. Components of Machine Rates.

a. Ownership Rates. Individual machine rates, both fixed and operating costs, were developed for each piece of equipment used in the schedule. Machine rates include:

(1) Total Investment (depreciable value). This item covers the basic machine and related equipment Acquisition cost--ready "to log". It does not include equipment requiring frequent replacement such as cables, lines and chokers, tires, etc., other than items which come on the machine when purchased. The residual value was estimated at the end of the machine's useful life when full maintenance had been applied or at the end of the first depreciable period, whichever seemed appropriate for the specific machine. The total investment (depreciable value) is the difference between the acquisition cost and residual value.

(2) Average Annual Investment. This item is computed for the purpose of estimating the fixed costs of insurance and property taxes. The formula,  $AAI = \frac{A}{2} + \frac{r}{2} + \frac{d}{2}$  is used to determine this investment where:

AAI = Average Annual Investment

A = Original Total Acquisition Cost of New Machine

r = Residual Value - or value of the machine at the end of the useful life or first depreciable period when full maintenance has been applied

d = Straight line depreciation per year

(3) Fixed Costs. This cost category includes ownership costs whether the machine is operating or not.

(i) Depreciation. Straight line depreciation is used in this cost schedule. The depreciable value (total investment) divided by the depreciable period (useful life or first depreciable period) equals the depreciation.

Thus:  $\frac{Ac - RV}{DP} = \text{Depreciation}$

When: Ac - is acquisition value  
RV - is residual value  
DP - is depreciation period (usually expressed in hours)

(ii) Insurance. Average property insurance rates for logging equipment was solicited from a major company writing such insurance in Oregon. Much of the variance related to individual operator's experience, preference rates, and the type of insurance "packages" purchased. The average for western Oregon is 1.25% of average annual investment.

9353.3 - PRODUCTION COSTS  
(Schedule 20)

(iii) Property Taxes. Individual county tax offices in the western Oregon districts were solicited for tax rates applicable to logging equipment. The average considered appropriate for Schedule 20 was 2.4% of average annual investment.

(4) Operating Costs. This cost category includes all materials incidental to operating the machine and replacement items which recur annually or more frequently, depending on actual operating time.

(i) Fuel and lubrication costs were obtained from a western Oregon survey of delivered materials made in the summer of 1976.

Fuel and lubrication rates used in Schedule 20 are:

Diesel fuel - without tax	\$0.38
Gasoline - without tax	\$0.43/gal
with tax	0.54/gal
Lubricating oil - with tax	\$1.84/gal
Hydraulic oil - with tax	\$1.84/gal
Gear grease	\$0.37/lb.

(ii) Repairs and maintenance costs were generally determined as a percentage of depreciation as found common for the particular type of machine. This item was obtained as an estimate from equipment firms and companies owning and operating specific types and models of machines used in the schedule.

(iii) Other operating expenses such as wire rope, chokers, chains for chain saws, etc., were obtained locally from established suppliers of such material.

9353.3 - PRODUCTION COSTS  
(Schedule 20)

b. Rental Rates. Individual machine rental rates apply to actual machine operating times, i.e., clock time on the machine. When using rental rates care must be used so that they are applied in this manner, particularly if delay time is a factor in the cost estimate. These rates include fuel, oil, lubrication, repairs, maintenance, insurance and individual expenses. Additional allowance should be made for drill steel and bits, etc., expendable items and supplies. Rates are indicative of those charged for machines of modern design and in good working condition. Rates provide that the equipment is available on the job. It is necessary to allow appropriate move-in as an additional item of cost.

9353.3 - PRODUCTION COSTS  
(Schedule 20)

3. Individual Machine Rates.

a. Summary

	<u>Machine</u>	<u>Fixed Cost/Hour</u>	<u>Operating Cost/Hour</u>	<u>Total Machine Cost/Hour</u>
(1)	Chain Saw - McCulloch - SP-125	\$0.40	\$0.93	\$ 1.33
(2)	Light Yarding Tractor Caterpillar D4D w/dozer & winch	4.64	4.31	8.95
(3)	Yarding Crawler Tractor Caterpillar D7G w/power shift	12.01	13.82	25.83
(3A)	FMC 210 CA	12.93	16.90	29.83
(4)	Rubber-tired Four-wheel Skidder John Deere - 440B (70 HP)	4.10	5.47	9.57
(5)	Swing Boom Yarder Washington 78A	20.46	12.95	33.41
(6)	Yarder-Portable 90' Tower - Trailer Mounted w/Berger Yarder	19.32	17.76	37.08
(7)	Yarder - Portable 110' Tower Trailer Mounted w/skagit Yarder	37.46	26.83	64.29
(8)	Static Skyline - Portable 110' Tower - Skagit BU-98 Yarder & 110' Tower	71.21	51.08	122.29
(9)	Mobile Yarder-Loader Skagit SJ-5R (Used)	11.90	10.20	22.10
(10)	Light Mobile Log Loader Barko Model 160	4.21	4.04	8.25
(11)	Heavy Mobile Log Loader Hydraulic Barko 450 (Tracked)	8.59	6.16	14.75
(11A)	Hydraulic Barko 450 (Rubber-Tired)	9.37	6.66	16.03
(12)	Front End Log Loader - Rubber- tired Caterpillar 966C (170HP)	5.54	7.90	13.44
(13)	Light (Misc. Use) Crawler Tractor Caterpillar D6C w/blade & winch	9.49	9.11	18.60

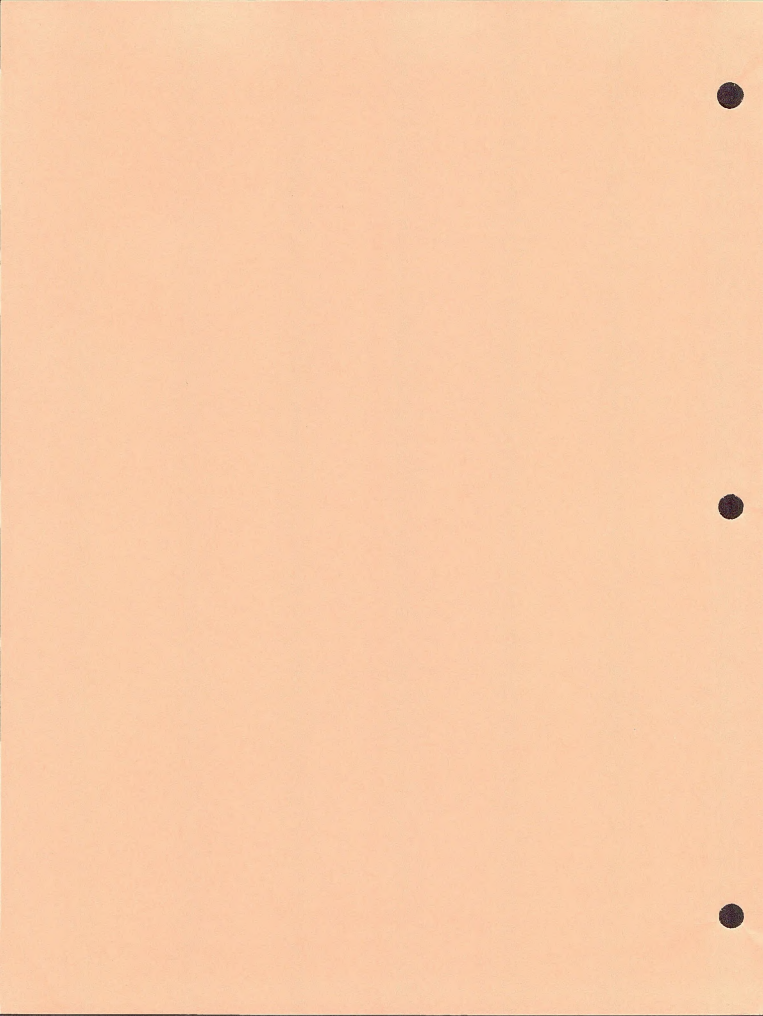


9353.3 - PRODUCTION COSTS  
(Schedule 20)

(14)	Tractor Mounted Dozer Caterpillar D8K (Power Shift) w/bulldozer and ripper	\$17.25	\$19.91	\$37.16
(15)	Front End (Bucket) Loader - Rubber-tired Caterpillar 950 - 2 to 2-1/2 C.Y.	(Rental rate)		26.60
(16)	Air Compressor & Drill - 150 CFM	(Rental rate)		7.76
(17)	Air Compressor & Track Drill - 600 CFM	(Rental rate)		44.76
(18)	Motor Scraper - Two Wheel Tractor 12 to 19 C.Y. Capacity	(Rental rate)		41.60
(19)	Shovel - Power 3/4 C.Y. Capacity	(Rental rate)		25.80
(20)	Dump Truck - Normal Duty 8 to 12 C.Y. Capacity	(Rental rate)		22.45
(21)	Road Roller - Vibratory 27 to 36 HP	(Rental rate)		14.70
(22)	Road Roller - Grid, 16 Ton	(Rental rate)		9.30
(23)	Motor Grader - Cat No. 12F	4.41	4.94	9.35
(23A)	Motor Grader BTWN - 2700 & 31,000 lbs.	(Rental rate)		23.70
(24)	Logging Truck White - Model 4964WD with Peerless Trailer	6.59	9.32	15.91
(25)	Crew Car (9-passenger carryall) GMC - 3/4 TON	.94	1.31	2.25

9353.3 - PRODUCTION COSTS  
(Schedule 20)

b. Rate Computations. Individual rate computations are listed in the sequence shown on the machine rate summary. Rate computation sheets summarize significant cost items. Smaller items such as towing cable sizes and lengths, rigging composition, number and sizes of tires, etc., have been individually listed and summarized. Wherever possible, complete machine costs - "ready to log" - were used. Distinction between ownership and rental rates are apparent.



9353.3 - PRODUCTION COSTS  
Schedule 20Machine Operating RatesItem No. 1I Description CHAINSAWMcCULLOCH --SP-125; 36" BARDIRECT DRIVE -- AUTOMATIC OILERWITH MISC. SMALL TOOLS; INCLUDING FIRE EXTINGUISHERII RateOwnership1/  
Rental

A. Fixed ... \$ 0.40 /hr.

\$ /hr.

B. Operating \$ 0.93 /hr.

\$ /hr.

Total . . . . . \$ 1.33 /hr.

\$ /hr.

. . . . . \$ .02 /min.

\$ /min.

1/ Based on scheduleIII Investment

## A. Acquisition (freight included)

Basic Machine . . . . . \$ 576.00

Attachments Small tools 140.00TOTAL \$ 716.00

B. Residual Value (total) . . . . . \$ 115.00

Chainsaw based on 20 % of investmentfor 1600 hrs. of (useful life-first-depreciable  
period)Small tools based on 0 % of investment.for 1600 hrs. of (useful life-first depreciable period)

C. Total Investment (depreciable value) \$ 601.00

D. Average Annual Investment . . . . . \$ 716.00 /yr.



9353.3 - PRODUCTION COSTS  
Schedule 20

IV. Fixed Cost (per hour of availability . . . . . \$ 0.40 /hr.  
(based on 1600 hours of annual machine availability)

A. Depreciation . . . . . \$ 0.38

B. Insurance (rate 1.25 % of ave. ann. Invest.) \$ 0.01  
Annual cost of \$ 8.95.

C. Property Taxes (rate 2.4 % of ave. ann. invest.) \$ 0.01  
Annual cost of \$ 17.18.

V. Operating Cost (per hour of operation) . . . . . \$ 0.93

A. Fuel (~~diesel~~ - gas) . . \$ 0.16 /hr.  
3 gal. per hour for \$ 0.54 per gal.

1) B. Oil and Grease . . . . . \$ 0.15 /hr.  
Lube oil - Crankcase        gph @ \$        per gal.  
Trans. & Drive        gph @ \$        per gal.  
Hyd. Oil        gph @ \$        per gal.  
Grease-        lbs. per hr. @ \$        per lbs.  
Filters- \$        per hr.

C. Repairs and Maintenance . . . . . \$ 0.34 /hr.  
90 % of depreciation

D. Tires . . . . . \$        /hr.  
\$        total cost @ "      " hrs. of tire life.

E. Other (Specify  
Chain replacement each 133 hours  
12 replacements per year @ \$37.50 per chain = \$450  
\$450 ÷ 1600hrs/yr. = 0.28/hr.

1) Dealer's estimate--based on increased price ratio of lubricating oils.

9353.3 - PRODUCTION COSTS  
Schedule 20Machine Operating RatesItem No. 2

I Description LIGHT YARDING TRACTOR  
CATERPILLAR D4D W/DOZER & WINCH DRUMLINE  
BUTT RIGGING, ETC.  
"READY TO LOG"

II Rate

	<u>Ownership</u>	<u>Rental</u> <sup>1/</sup>
A. Fixed ...	\$ <u>4.64</u> /hr.	\$ _____ /hr.
B. Operating	\$ <u>4.31</u> /hr.	\$ _____ /hr.
Total . . . . .	\$ <u>8.95</u> /hr.	\$ _____ /hr.
	\$ <u>0.15</u> /min.	\$ _____ /min.

<sup>1/</sup> Based on schedule \_\_\_\_\_

III Investment

A. Acquisition (freight included)

Basic Machine . . . . . \$ 41404

Attachments As listed above

\_\_\_\_\_ \$ 41599

B. Residual Value (total) . . . . . \$ 4,140

Basic Machine based on 10 % of investment

for 10000 hrs. of (useful life-~~first depreciable period~~  
~~period~~)

Drumline & Riggings based on 0 % of investment.

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

C. Total Investment (depreciable value) \$ 37459

D. Average Annual Investment . . . . . \$ 24742 /yr.

9353.3 - PRODUCTION COSTS  
Schedule 20

IV. Fixed Cost (per hour of availability . . . . . \$ 4.64 /hr.  
(based on 1000 hours of annual machine availability

A. Depreciation . . . . . \$ 3.74

B. Insurance (rate 1.25 % of ave. ann. Invest.) \$ 0.31  
Annual cost of \$ 309.

C. Property Taxes (rate 2.4 % of ave. ann. invest.) \$ 0.59  
Annual cost of \$ 594.

V. Operating Cost (per hour of operation) . . . . . \$ 4.31

A. Fuel (diesel - gas) . . \$ 0.99 /hr.  
2.6 gal. per hour for \$ .38 per gal.

B. Oil and Grease . . . . . \$ 0.20 /hr.  
Lube oil - Crankcase .02 gph @ \$ 1.84 per gal.  
Trans. & Drive .02 gph @ \$ 1.84 per gal.  
Hyd. Oil .01 gph @ \$ 1.83 per gal.  
Grease .05 lbs. per hr. @ \$ 0.37 per lbs.  
Filters \$ .05 per hr.

C. Repairs and Maintenance . . . . . \$ 2.24 /hr.  
60 % of depreciation

D. Tires . . . . . \$          /hr.  
\$          total cost @ "          " hrs. of tire life.

E. Other (Specify  
Towing Cable: 150' of 3/4" @ \$0.69/ft. = \$103.50  
Ferrule = 8.27  
\$111.77 Replace at  
1000 hrs. = \$ 0.14/hr.

Chokers: Deduction for recovery of 1/2 value of choker hook Ferrule  
& S.S. Sleeve

Hook = \$ 5.09  
Ferrule = 5.78  
S.S. Sleeve = 3.45  
\$14.32 ÷ 2 = \$7.16

Choker Cost = \$27.62  
-7.16  
\$20.46/choker;

Replace 3 @ 80 hrs = (3 x 20.46) =  $\frac{\$61.38}{80 \text{ hrs}}$  = 0.77/hr

9353.3 - PRODUCTION COSTS  
Schedule 20Machine Operating RatesItem No. 3I Description YARDING CRAWLER TRACTORCATERPILLAR D7G, POWER SHIFT, S DOZER, WINCH &LOWER GUARDS - CONVENTIONAL LOGGERII RateOwnershipRental <sup>1/</sup>A. Fixed ... \$ 12.01 /hr.

\$ \_\_\_\_\_ /hr.

B. Operating \$ 13.82 /hr.

\$ \_\_\_\_\_ /hr.

Total . . . . . \$ 25.83 /hr.

\$ \_\_\_\_\_ /hr.

. . . . . \$ 0.43 /min.

\$ \_\_\_\_\_ /min.

<sup>1/</sup> Based on schedule \_\_\_\_\_III Investment

## A. Acquisition (freight included)

Basic Machine . . . . . \$ 109319Attachments As listed above

\$ \_\_\_\_\_

B. Residual Value (total) . . . . . \$ 27380Total \_\_\_\_\_ based on 25 % of investmentfor 8400 hrs. of (useful life-~~first depreciable period~~  
~~xxxx~~)

\_\_\_\_\_ based on \_\_\_\_\_ % of investment.

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

C. Total Investment (depreciable value) \$ 81989D. Average Annual Investment . . . . . \$ 74179 /yr.



9353.3 - PRODUCTION COSTS  
Schedule 20

IV. Fixed Cost (per hour of availability . . . . . \$ 12.01 /hr.  
(based on 1200 hours of annual machine availability

- A. Depreciation . . . . . \$ 9.76
- B. Insurance (rate 1.25 % of ave. ann. Invest.) \$ 0.77  
Annual cost of \$ 927.
- C. Property Taxes (rate 2.4 % of ave. ann. invest.) \$ 1.48  
Annual cost of \$ 1780.

V. Operating Cost (per hour of operation) . . . . . \$ 13.82

- A. Fuel (diesel - gas) . . \$ 2.85 /hr.  
7.5 gal. per hour for \$ .38 per gal.
- B. Oil and Grease . . . . . \$ 0.31 /hr.  
Lube oil - Crankcase .04 gph @ \$ 1.84 per gal.  
Trans. & Drive .05 gph @ \$ 1.84 per gal.  
Hyd. Oil .03 gph @ \$ 1.83 per gal.  
Grease .05 lbs. per hr. @ \$ .37 per lbs.  
Filters - \$ .07 per hr.

C. Repairs and Maintenance . . . . . \$ 9.16 /hr.  
94 % of depreciation

D. Tires . . . . . \$            /hr.  
\$            total cost @ "            " hrs. of tire life.

E. Other (Specify Towing Cable: 150' of 1½" @ \$1.53/ft. = \$229.50  
Light Ferrule = 8.27  
\$237.77

Replace @ 1000 hrs. =  $237.77 \div 1000 = 0.24$ /hr.

Chokers: 3/4" x 25' = \$28.90  
Hook = 10.00  
\$38.90

Initial 3 chokers complete @ \$38.90 ea. = \$ 116.70  
Replacement each 80 hrs requires 312 chokes @ 38.90 ea. = \$9016.80  
½ hook replacements requires 156 hooks @ 10.00 ea. = 1560.00  
Total = \$10693.50

$\$10693.50 \div 8400 \text{ hrs.} = \$1.27/\text{hr.}$

9353.3 - PRODUCTION COSTS  
Schedule 20Machine Operating RatesItem No. 3 AI Description FMC 210 CACHOKER ARCH HIGH-SPEED LOGGING VEHICLE"Low Ground Pressure Tractor"II RateOwnershipRental 1/A. Fixed ... \$ 12.93 /hr.

\$ \_\_\_\_\_ /hr.

B. Operating \$ 16.90 /hr.

\$ \_\_\_\_\_ /hr.

Total . . . . . \$ 29.83 /hr.

\$ \_\_\_\_\_ /hr.

. . . . . \$ 0.50 /min.

\$ \_\_\_\_\_ /min.

1/ Based on schedule \_\_\_\_\_III Investment

A. Acquisition (freight included)

Basic Machine . . . . . \$ 99,334Hyster Winch . . . . . 2,750Attachments 75' of 3/4" wire rope 55TOTAL \$ 102,139B. Residual Value (total) . . . . . \$ 25,521Machine & Winch based on 25 % of investmentfor 7000 hrs. of (useful life-~~first depreciable~~  
~~period~~)

\_\_\_\_\_ based on \_\_\_\_\_ % of investment.

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

C. Total Investment (depreciable value) \$ 76,618D. Average Annual Investment . . . . . \$ 70,941 /yr.

9353.3 - PRODUCTION COSTS  
Schedule 20

IV. Fixed Cost (per hour of availability . . . . . \$ 12.93 /hr.  
(based on 1300 hours of annual machine availability

- A. Depreciation . . . . . \$ 10.94
- B. Insurance (rate 1.25 % of ave. ann. Invest.) \$ 0.68  
Annual cost of \$ 887.
- C. Property Taxes (rate 2.4 % of ave. ann. invest.) \$ 1.31  
Annual cost of \$ 1703.

V. Operating Cost (per hour of operation) . . . . . \$ 16.90

- A. Fuel (diesel - ~~gas~~) . . \$ 2.28 /hr.  
6 gal. per hour for \$ 0.38 per gal.
- B. Oil and Grease <sup>(25% of fuel cost)</sup> . . . . . \$ 0.57 /hr.  
Lube oil - Crankcase        gph @ \$        per gal.  
Trans. & Drive        gph @ \$        per gal.  
Hyd. Oil        gph @ \$        per gal.  
Grease-        lbs. per hr. @ \$        per lbs.  
Filters- \$        per hr.
- C. Repairs and Maintenance . . . . . \$ 9.85 /hr.  
90 % of depreciation
- D. Tires . . . . . \$        /hr.  
\$        total cost @ "      " hrs. of tire life.
- E. Other (Specify  
Replace tracts @ 4000 hrs. =  $\$9000 \div 4000 \text{ hrs.} = \$2.25/\text{hr.}$   
Towing cable; 75' of 3/4" @  $\$0.75/\text{ft} = \$54.75$   
Ferrule =  $+8.27$   
\$63.02  
Replace @ 1000 hrs.  $\$63.02 \div 1000 \text{ hrs.} = \$0.06/\text{hr.}$
- Chokers;  
Deduction for recovery of  $\frac{1}{2}$  value of choker hook  
Choker; 3/4" x 20' =  $\$25.30$   
Light hook  $+10.00$   
\$35.30  
Replacement of  $\frac{1}{2}$  of  
 $\$10.00 = -5.00$   
TOTAL- \$30.30  
Choker cost=  $\$30.30 \times 5 \text{ chokers} = \$151.50$   
Replace @ 80 hrs. =  $\$151.50 \div 80 \text{ hrs.} = \$1.89/\text{hr.}$

9353.3 - PRODUCTION COSTS  
Schedule 20Machine Operating RatesItem No. 4

I Description RUBBER TIRED FOUR WHEEL SKIDDER  
JOHN DEERE 440B-70 H.P. W/BLADE  
& WINCH  
"READY TO LOG"

II	<u>Rate</u>	<u>Ownership</u>	<u>Rental</u> <sup>1/</sup>
A.	Fixed ...	\$ <u>4.10</u> /hr.	\$ _____ /hr.
B.	Operating \$	<u>5.47</u> /hr.	\$ _____ /hr.
	Total . . . . .	\$ <u>9.57</u> /hr.	\$ _____ /hr.
		\$ <u>0.16</u> /min.	\$ _____ /min.

<sup>1/</sup> Based on schedule \_\_\_\_\_

III Investment

A. Acquisition (freight included)  
Basic Machine . . . . . \$ 31900  
Attachments \_\_\_\_\_  
\$ \_\_\_\_\_  
B. Residual Value (total) . . . . . \$ 12760  
\_\_\_\_\_ total based on 40 % of investment  
for 6000 hrs. of (useful life-first depreciable  
period)  
\_\_\_\_\_ based on \_\_\_\_\_ % of investment.  
for \_\_\_\_\_ hrs. of (useful life-first depreciable period)  
C. Total Investment (depreciable value) \$ 19140  
D. Average Annual Investment . . . . . \$ 24882 /yr.



9353.3 - PRODUCTION COSTS  
Schedule 20

IV. Fixed Cost (per hour of availability . . . . . \$ 4.10 /hr.  
(based on 1000 hours of annual machine availability)

A. Depreciation . . . . . \$ 3.19

B. Insurance (rate 1.25 % of ave. ann. Invest.) \$ .31  
Annual cost of \$ 311.02.

C. Property Taxes (rate 2.4 % of ave. ann. invest.) \$ .60  
Annual cost of \$ 597.16.

V. Operating Cost (per hour of operation) . . . . . \$ 5.47

A. Fuel (diesel - gas) . . \$ 0.76 /hr.  
2 gal. per hour for \$ 0.38 per gal.

B. Oil and Grease . . . . . \$ 0.26 /hr.  
Lube oil - Crankcase \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Trans. & Drive \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Hyd. Oil \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Grease- \_\_\_\_\_ lbs. per hr. @ \$ \_\_\_\_\_ per lbs.  
Filters- \$ \_\_\_\_\_ per hr.

C. Repairs and Maintenance . . . . . \$ 2.87 /hr.  
90 % of depreciation

D. Tires . . . . . \$ 0.36 /hr.  
\$ 2188 total cost @ "6000" hrs. of tire life.

E. Other (Specify  
Tires: 1 Replacement = 6000 hr live of 4408 skidder  
4 Tires: 18.4 x 26; 10 ply = \$547.20/Tire = \$2188

Chokers: 6 chokers replace @ 80 hrs.  
15' of ½" cat choker = \$13.80  
Midjet ball hook = +4.20  
Replacement: ½ x 4.20 = -2.10  
\$15.90 x 6 = \$95.40  
\$95.40 ÷ 80 hrs. = \$1.19/hr.

9353.3 - PRODUCTION COSTS  
Schedule 20

Machine Operating Rates

Item No. 5

I Description SMALL YARDER, WASHINGTON 78A, SKYLOCK YARDER  
WITH SWING BOOM TRACK YARDER, CUMMINGS V555, 197 HP  
Diesel Engine  
"RIGGED FOR HIGHLEAD YARDING"

II	<u>Rate</u>	<u>Ownership</u>	<u>Rental</u> <sup>1/</sup>
A.	Fixed ...	\$ <u>20.46</u> /hr.	\$ _____/hr.
B.	Operating	\$ <u>12.95</u> /hr.	\$ _____/hr.
	Total . . . . .	\$ <u>33.41</u> /hr.	\$ _____/hr.
		\$ <u>0.56</u> /min.	\$ _____/min.

<sup>1/</sup> Based on schedule \_\_\_\_\_

III Investment

A. Acquisition (freight included)

Basic Machine . . . . .	\$ <u>295,000</u>
Attachments <u>Asst. Rigging</u>	<u>8,500</u>
	\$ <u>303,500</u>

B. Residual Value (total) . . . . . \$ 44,250

Yarder-Tower based on 15 % of investment  
for 16000 hrs. of (useful life-~~first depreciable~~  
<sup>period</sup>  
Asst. Rigging based on 0 % of investment.  
for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

C. Total Investment (depreciable value) \$ 259,250

D. Average Annual Investment . . . . . \$ 186,837 /yr.

9353.3 - PRODUCTION COSTS  
Schedule 20

IV. Fixed Cost (per hour of availability . . . . . \$ 20.46 /hr.  
(based on 1600 hours of annual machine availability

- A. Depreciation . . . . . \$ 16.20
- B. Insurance (rate 1.25 % of ave. ann. Invest.) \$ 1.46  
Annual cost of \$ 2335.
- C. Property Taxes (rate 2.4 % of ave. ann. invest.) \$ 2.80  
Annual cost of \$ 4484.

V. Operating Cost (per hour of operation) . . . . . \$ 12.95

- A. Fuel (diesel - gas) . . \$ 4.03 /hr.  
10.6 gal. per hour for \$ 0.38 per gal.
- B. Oil and Grease . . . . . \$ 1.01 /hr. (25% of fuel cost)  
Lube oil - Crankcase \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Trans. & Drive \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Hyd. Oil \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Grease- \_\_\_\_\_ lbs. per hr. @ \$ \_\_\_\_\_ per lbs.  
Filters- \$ \_\_\_\_\_ per hr.
- C. Repairs and Maintenance . . . . . \$ 4.86 /hr.  
30 % of depreciation
- D. Tires . . . . . \$ \_\_\_\_\_ /hr.  
\$ \_\_\_\_\_ total cost @ " \_\_\_\_\_ " hrs. of tire life.
- E. Other (Specify Wire rope and Chokers  
Mainline: 1050' of 3/4" @ \$0.73/ft. = \$766.50  
Haulback: 2100' of 5/8" @ \$0.50/ft. = 1050.00  
\$1816.50  
Replace every 1000 hrs. = \$1.82  
Strawline: 3000' of 3/8" @ \$0.30/ft. = \$900.00 \$1.82  
Replace every 4000 hrs. = \$0.23/hr. 0.23/hr.  
\$2.05/hr.  
Chokers: use 3 chokers 20' of 3/4" wire @ \$23.20 ea.  
Bantam choke hook @ 6.60 ea.  
Choker Wire & Hook \$29.80  
Deduction for recovery of 1/2 value of hooks  
\$6.60 ÷ 2 = \$3.30: \$29.80 - \$3.30 = \$26.50  
3 chokers @ \$26.50 = \$79.50 Replace @ 80 hrs. = \$1.00/hr.

9353.3 - PRODUCTION COSTS  
Schedule 20Machine Operating RatesItem No. 6

I Description YARDER - PORTABLE 90' TOWER  
BERGER ME STANDARD YARDER - PORTABLE TOWER  
TRAILER MOUNTED, ASSOCIATED HEAVY EXTERIOR RIGGING

II Rate

	<u>Ownership</u>	<u>Rental</u> <sup>1/</sup>
A. Fixed ...	\$ <u>19.32</u> /hr.	\$ _____ /hr.
B. Operating	\$ <u>17.76</u> /hr.	\$ _____ /hr.
Total . . . . .	\$ <u>37.08</u> /hr.	\$ _____ /hr.
	\$ <u>.62</u> /min.	\$ _____ /min.

<sup>1/</sup> Based on schedule \_\_\_\_\_

III Investment

A. Acquisition (freight included)

Basic Machine . . . . . \$ 284,685

Attachments Radio 3,000

\$ 287,685

B. Residual Value (total) . . . . . \$ 42,703

Yarder-Trailer based on 15 % of investment

for 16000 hrs. of (useful life-~~first depreciable~~  
~~period~~  
~~period~~)

Rigging based on 0 % of investment.

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

C. Total Investment (depreciable value) \$ 244,982

D. Average Annual Investment . . . . . \$ 177,443 /yr.



9353.3 - PRODUCTION COSTS  
Schedule 20IV. Fixed Cost (per hour of availability). . . . . \$ 19.32 /hr.  
(based on 1600 hours of annual machine availability)A. Depreciation . . . . . \$ 15.31B. Insurance (rate 1.25 % of ave. ann. Invest.) \$ 1.39  
Annual cost of \$ 2218.C. Property Taxes (rate 2.4 % of ave. ann. invest.) \$ 2.66  
Annual cost of \$ 4259.V. Operating Cost (per hour of operation) . . . . . \$ 17.76A. Fuel (diesel - ~~gas~~) . . \$ 2.28 /hr.  
6 gal. per hour for \$ .38 per gal.B. Oil and Grease . . . . . \$ 0.34 /hr. (15% of fuel cost)Lube oil - Crankcase        gph @ \$        per gal.Trans. & Drive        gph @ \$        per gal.Hyd. Oil        gph @ \$        per gal.Grease-        lbs. per hr. @ \$        per lbs.Filters- \$        per hr.C. Repairs and Maintenance . . . . . \$ 7.66 /hr.  
50 % of depreciationD. Tires . . . . . \$        /hr.  
\$        total cost @ "      " hrs. of tire life.

E. Other (Specify) Wire Rope

Mainline: 1400' of 1½" @ \$1.53/ft. Replace @ 1000 hrs = 2.142/hr

Haulback: 3500' of 7/8" @ .928/ft. Replace @ 2000 hrs = 1.624/hr

Strawline: 3400' of 7/16" @ .368/ft. Replace @ 8000 hrs = .156/hr

Chokers - Use 4

36' x 1 @ 47.80 ea.

Light Jr. Choker Hook = 9.60 ea.

2J9 Ferrules = 18.60 ea.

\$ 76.00

Deduction for recovery

½ value of hook = -4.80

\$ 71.20 x 4 = 284.80 replace @ 80 hr. =\$ 3.560/hr\$ 7.48/hr

9353.3 - PRODUCTION COSTS  
Schedule 20Machine Operating RatesItem No. 7

I Description YARDER-PORTABLE 110' TOWER  
SKAGIT BU 98 YARDER T110 TOWER  
ASSOCIATED HEAVY EXTERIOR RIGGING

II	<u>Rate</u>	<u>Ownership</u>	<u>Rental</u> <sup>1/</sup>
A.	Fixed ...	\$ <u>37.46</u> /hr.	\$ _____ /hr.
B.	Operating	\$ <u>26.83</u> /hr.	\$ _____ /hr.
	Total . . . . .	\$ <u>64.29</u> /hr.	\$ _____ /hr.
	. . . . .	\$ <u>1.07</u> /min.	\$ _____ /min.

<sup>1/</sup> Based on schedule \_\_\_\_\_III Investment

## A. Acquisition (freight included)

Basic Machine . . . . .	\$ <u>213,900</u>
Radio ....	<u>7,500</u>
Attachments Trailer Mounted Tower	<u>316,150</u>
Assoc. Rigging . . . . .	<u>17,000</u>
Total Cost	\$ <u>554,550</u>

B. Residual Value (total) . . . . . \$ 79,507Yarder/Tower based on 15 % of investmentfor 16000 hrs. of (useful life-first depreciable  
period)Rigging & Radio based on 0 % of investment.for 16000 hrs. of (useful life-first depreciable period)C. Total Investment (depreciable value) \$ 475,043D. Average Annual Investment . . . . . \$ 340,755 /yr.

9353.3 - PRODUCTION COSTS  
Schedule 20

IV. Fixed Cost (per hour of availability) . . . . . \$ 37.46 /hr.  
(based on 1600 hours of annual machine availability)

A. Depreciation . . . . . \$ 29.69

B. Insurance (rate 1.25 % of ave. ann. Invest.) \$ 2.66  
Annual cost of \$ 4259.43.

C. Property Taxes (rate 2.4 % of ave. ann. invest.) \$ 5.11  
Annual cost of \$ 8178.12.

V. Operating Cost (per hour of operation) . . . . . \$ 26.83

A. Fuel (diesel - ~~gas~~) . . \$ 3.80 /hr.  
10 gal. per hour for \$ 0.38 per gal.

B. Oil and Grease . . . . . \$ 0.57 /hr. (15% of Fuel cost)  
Lube oil - Crankcase        gph @ \$        per gal.  
Trans. & Drive        gph @ \$        per gal.  
Hyd. Oil        gph @ \$        per gal.  
Grease-        lbs. per hr. @ \$        per lbs.  
Filters- \$        per hr.

C. Repairs and Maintenance . . . . . \$ 14.83 /hr.  
50 % of depreciation

D. Tires . . . . . \$        /hr.  
\$        total cost @ "      " hrs. of tire life.

E. Other (Specify  
Mainline: 1500' of 1½" @ \$1.53/ft. = 2295,  
Replace @ 1000 hrs. 2.29/hr.  
Haulback: 3500' of 7/8" @ .928/ft. = 3248  
Replace @ 2000 hrs. 1.62/hr.  
Strawline: 3500' of 7/16" @ .368/ft.  
Replace @ 8000 hrs. 0.16/hr.

Chokers - 4  
36' x 1" @ 47.80 ea. = \$47.80  
Light Jr. choker hook @ 9.60 = 9.60  
2J9 Ferrules = 18.60  
\$76.00

Deduction for recovery of ½ value of shoker hook  
 $\frac{9.60}{2} = -4.80$   
\$71.20

71.20 x 4 = \$284.80 Replace @ 80 hrs. 3.56/hr.

9353.3 - PRODUCTION COSTS  
Schedule 20Machine Operating RatesItem No. 8

- I Description STATIC SKYLINE-PORTABLE 110' TOWER  
SKAGIT BU 98 YARDER T-110' TOWER & REC -15  
SKYCAR (RADIO CONTROLLED) - SKYLINE SINGLE DRUM  
ASSOCIATED HEAVY RIGGING

II	<u>Rate</u>	<u>1/</u>	
		<u>Ownership</u>	<u>Rental</u>
A.	Fixed ...	\$ <u>71.21</u> /hr.	\$ _____ /hr.
B.	Operating	\$ <u>51.08</u> /hr.	\$ _____ /hr.
	Total . . . . .	\$ <u>122.29</u> /hr.	\$ _____ /hr.
		\$ <u>2.04</u> /min.	\$ _____ /min.
	<u>1/</u> Based on schedule _____		

III Investment

- A. Acquisition (freight included)
- |                          |                   |
|--------------------------|-------------------|
| Basic Machine . . . . .  | \$ <u>573,500</u> |
| Skycar Rec 15 + Drum     | <u>151,000</u>    |
| Attachments <u>Radio</u> | <u>7,500</u>      |
|                          | \$ <u>732,000</u> |
- B. Residual Value (total) . . . . . \$ 93,025
- \_\_\_\_\_ based on \_\_\_\_\_ % of investment
- for \_\_\_\_\_ hrs. of (useful life-first depreciable period)
- \_\_\_\_\_ based on \_\_\_\_\_ % of investment.
- for \_\_\_\_\_ hrs. of (useful life-first depreciable period)
- C. Total Investment (depreciable value) \$ 638,975
- D. Average Annual Investment . . . . . \$ 461,037 /yr.



9353.3 - PRODUCTION COSTS  
Schedule 20

IV. Fixed Cost (per hour of availability . . . . . \$ 71.21 /hr.  
(based on 1600 hours of annual machine availability

- A. Depreciation . . . . . \$ 60.66
- B. Insurance (rate 1.25 % of ave. ann. Invest.) \$ 3.63  
Annual cost of \$ 5800.
- C. Property Taxes (rate 2.4 % of ave. ann. invest.) \$ 6.92  
Annual cost of \$ 11,065.

V. Operating Cost (per hour of operation) . . . . . \$ 51.08

- A. Fuel (diesel - ~~343~~) . . \$ 3.80 /hr.  
10 gal. per hour for \$ \_\_\_\_\_ per gal.
- B. Oil and Grease . . . . . \$ 0.57 /hr.  
(15% - Of Fuel Cost)
- Lube oil - Crankcase \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Trans. & Drive \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Hyd. Oil \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Grease- \_\_\_\_\_ lbs. per hr. @ \$ \_\_\_\_\_ per lbs.  
Filters- \$ \_\_\_\_\_ per hr.
- C. Repairs and Maintenance . . . . . \$ 29.16 /hr.  
48 % of depreciation
- D. Tires . . . . . \$ \_\_\_\_\_ /hr.  
\$ \_\_\_\_\_ total cost @ " \_\_\_\_\_ " hrs. of tire life.

E. Other (Specify  
RIGGING COST = \$17.55/hr.

Investment	Acquisition	Life Hours	Residual %	Total Investment
Yarder-Tower	\$573,000	16,000	15	\$487,475
Skycar Rec. 15	81,000	3,000	0	81,000
Drum	70,000	16,000	10	63,000
Radio	7,500	8,000	0	7,500
	<u>\$732,000</u>			<u>\$638,975</u>

9353.3 - PRODUCTION COSTS  
Schedule 20Machine Operating RatesItem No. 9

- I Description MOBILE YARDER-LOADER: SKAGIT SJ-5R,  
(USED EQUIPMENT) RUBBER TIRED CARRIER -  
STANDARD OUT RIGGING. "READY TO LOG"

II	<u>Rate</u>	<u>1/</u>	
		<u>Ownership</u>	<u>Rental</u>
A.	Fixed ...	\$ <u>11.90</u> /hr.	\$ _____ /hr.
B.	Operating	\$ <u>10.20</u> /hr.	\$ _____ /hr.
	Total . . . . .	\$ <u>22.10</u> /hr.	\$ _____ /hr.
		\$ <u>0.37</u> /min.	\$ _____ /min.

1/ Based on schedule \_\_\_\_\_III Investment

- A. Acquisition (freight included)
- Basic Machine . . . . . \$ 85,000
- Attachments Ass. Rigging & Radio 8,000
- \_\_\_\_\_ \$ 93,000
- B. Residual Value (total) . . . . . \$ 8,500
- BASIC MACHINE based on 10 % of investment
- for 8,000 hrs. of (useful life-first-depreciable  
period)
- RIGGING & RADIO based on 0 % of investment.
- for 8,000 hrs. of (useful life-first depreciable period)
- C. Total Investment (depreciable value) \$ 84,500
- D. Average Annual Investment . . . . . \$ 59,198 /yr.

9353.3 - PRODUCTION COSTS

Schedule 20

IV Fixed Cost (per hour of availability . . . . . \$ 11.90 /hr.  
(based on 1600 hours of annual machine availability)

A. Depreciation . . . . . \$ 10.56

B. Insurance (rate 1.25 % of ave. ann. invest.) \$ .46  
Annual cost of \$ 740 .

C. Property Taxes (rate 2.4 % of ave.ann.invest) \$ .88  
Annual cost of \$ 1421 .

V Operating Cost(per hour of operation) . . . . . \$ 10.20

A. Fuel (diesel - ~~gas~~) . . . \$ 2.47 /hr.  
6.5 gal. per hour for \$ 0.38 per gal.

B. Oil and Grease . . . . . \$ 0.37 /hr.  
(15% of fuel cost)  
Lube oil - Crankcase        gph @ \$        per gal.  
Trans. & Drive        gph @ \$        per gal.  
Hyd. Oil        gph @ \$        per gal.  
Grease        lbs. per hr. @ \$        per lbs.  
Filters-\$        per hr.

C. Repairs and Maintenance . . . . . \$ 4.78 /hr.  
50 % of depreciation on yarder

D. Tires . . . . . \$        /hr.  
\$        total cost @ "        " hrs. of tire life.

E. Other (specify) Wire Rope  
Mainline: 700' of 1" @ \$1.34 = \$938 Replace @ 800 hrs.= \$1.17/hr.  
Haulback: 1630' " 5/8" @ .586 = 955 " " 1500 " = .63  
Strawline: 2050' " 5/16" @ .330 = 676 " " 3000 " = .22  
\$2.02/hr.

Chokers:

VI Remarks Use 2 chokers: 20' of 3/4" highlead = \$23.20 each  
Hook light = 10.00 "  
\$33.20 "

Deduction for recovery of 1/2 value of hook = \$10.00 ÷ 2 = \$5.00  
\$32.20 - \$5.00 = \$28.20 ea. x 2 chokers= \$56.40  
Replace @ 100 hrs. = \$56.40 ÷ 100 hrs.= \$0.56/hr.

9353.3 - PRODUCTION COSTS  
Schedule 20

Machine Operating Rates

Item No. 10

I Description LIGHT MOBILE HYDRAULIC LOG LOADER  
BARKO MODEL 160  
MOUNTED ON USED LOGGING TRUCK

II Rate

	<u>Ownership</u>	<u>Rental</u> <sup>1/</sup>
A. Fixed ...	\$ <u>4.21</u> /hr.	\$ _____/hr.
B. Operating \$	<u>4.04</u> /hr.	\$ _____/hr.
Total . . . . .	\$ <u>8.25</u> /hr.	\$ _____/hr.
	. . . . . \$ <u>14</u> /min.	\$ _____/min.

<sup>1/</sup> Based on schedule \_\_\_\_\_

III Investment

A. Acquisition (freight included)

Basic Machine . . . . .	\$ <u>33,000</u>
Used logging truck and	
Attachments _____	<u>installation 9,500</u>
	\$ <u>42,500</u>

B. Residual Value (total) . . . . . \$ 6,600

\_\_\_\_\_ Loader based on 20 % of investment

for 10,000 hrs. of (useful life-first depreciable  
~~period~~  
\_\_\_\_\_ based on \_\_\_\_\_ % of investment.

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

C. Total Investment (depreciable value) \$ 35,900

D. Average Annual Investment . . . . . \$ 27,422 /yr.



9353.3 - PRODUCTION COSTS  
Schedule 20

IV. Fixed Cost (per hour of availability . . . . . \$ 4.21 /hr.  
(based on 1600 hours of annual machine availability

A. Depreciation . . . . . \$ 3.59

B. Insurance (rate 1.25 % of ave. ann. Invest.) \$ .21  
Annual cost of \$ 343.00.

C. Property Taxes (rate 2.4 % of ave. ann. invest.) \$ .41  
Annual cost of \$ 658.00.

V. Operating Cost (per hour of operation) . . . . . \$ 4.04

A. Fuel (diesel - gas) . . \$ 1.90 /hr.  
5.0 gal. per hour for \$ 0.38 per gal.

B. Oil and Grease . . . . . \$ 0.28 /hr. (15% of fuel cost)  
Lube oil - Crankcase        gph @ \$        per gal.  
Trans. & Drive        gph @ \$        per gal.  
Hyd. Oil        gph @ \$        per gal.  
Grease-        lbs. per hr. @ \$        per lbs.  
Filters- \$        per hr.

C. Repairs and Maintenance . . . . . \$ 1.79 /hr.  
50 % of depreciation

D. Tires . . . . . \$ 0.07 /hr.  
\$ 684.50 total cost @ "10,000" hrs. of tire life.

E. Other (Specify

Tires; Used 1 set of recaps = \$68.45/tire x 10 tires = \$684.50  
\$684.50 ÷ 10,000 hrs = \$0.68/hr.

9353.3 - PRODUCTION COSTS  
Schedule 20Machine Operating RatesItem No. 11

I Description HEAVY MOBILE HYDRAULIC LOG LOADER  
BARKO 450 TRACK LOADER 60" GRAPPLE  
SELF CONTAINED CARRIER

II Rate

	<u>Ownership</u>	<u>Rental</u> <sup>1/</sup>
A. Fixed ...	\$ <u>8.59</u> /hr.	\$ _____ /hr.
B. Operating	\$ <u>6.16</u> /hr.	\$ _____ /hr.
Total . . . . .	\$ <u>14.75</u> /hr.	\$ _____ /hr.
	\$ <u>.25</u> /min.	\$ _____ /min.

1/ Based on schedule \_\_\_\_\_

III Investment

A. Acquisition (freight included)

Basic Machine . . . . . \$ 133,000

Attachments \_\_\_\_\_

\_\_\_\_\_ \$ \_\_\_\_\_

B. Residual Value (total) . . . . . \$ 26,600

TOTAL MACHINE based on 20 % of investment

for 16,000 hrs. of (useful life-first depreciable  
period)-  
\_\_\_\_\_ based on \_\_\_\_\_ % of investment.

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

C. Total Investment (depreciable value) \$ 106,400

D. Average Annual Investment . . . . . \$ 85,120 /yr.

9353.3 - PRODUCTION COSTS  
Schedule 20

IV. Fixed Cost (per hour of availability . . . . . \$ 8.59 /hr.  
(based on 1600 hours of annual machine availability

A. Depreciation . . . . . \$ 6.65

B. Insurance (rate 1.25 % of ave. ann. Invest.) \$ .66  
Annual cost of \$ 1065.

C. Property Taxes (rate 2.4 % of ave. ann. invest.) \$ 1.28  
Annual cost of \$ 2043.

V. Operating Cost (per hour of operation) . . . . . \$ 6.16

A. Fuel (diesel - ~~gas~~) . . \$ 2.47 /hr.  
6.5 gal. per hour for \$ .38 per gal.

B. Oil and Grease . . . . . \$ 0.37 /hr.--(15% of fuel cost)  
Lube oil - Crankcase \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Trans. & Drive \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Hyd. Oil \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Grease- \_\_\_\_\_ lbs. per.hr. @ \$ \_\_\_\_\_ per lbs.  
Filters-\$ \_\_\_\_\_ per hr.

C. Repairs and Maintenance . . . . . \$ 3.32 /hr.  
50 % of depreciation

D. Tires . . . . . \$ \_\_\_\_\_ /hr.  
\$ \_\_\_\_\_ total cost @ " \_\_\_\_\_ " hrs. of tire life.

E. Other (Specify

9353.3 - PRODUCTION COSTS  
Schedule 20

Machine Operating Rates

Item No. 11A

I Description HEAVY MOBILE HYDRAULIC LOG LOADER  
BARKO 450; RUBBER TIRED;-60" GRAPPLE;  
SELF CONTAINED CARRIER, MOUNTED ON PIERCE CARRIER  
3 AXLE MACHINE

II	<u>Rate</u>	<u>Ownership</u>	<u>Rental</u> <sup>1/</sup>
A.	Fixed ...	\$ <u>9.37</u> /hr.	\$ _____ /hr.
B.	Operating	\$ <u>6.66</u> /hr.	\$ _____ /hr.
	Total . . . . .	\$ <u>16.03</u> /hr.	\$ _____ /hr.
		\$ <u>0.27</u> /min.	\$ _____ /min.
	1/ Based on schedule _____		

III Investment

A. Acquisition (freight included)

Basic Machine . . . . . \$ 145,000

Attachments \_\_\_\_\_

\_\_\_\_\_ \$ \_\_\_\_\_

B. Residual Value (total) . . . . . \$ 29,000

TOTAL MACHINE based on 20 % of investment

for 16,000 hrs. of (useful life-first depreciable period)

\_\_\_\_\_ based on \_\_\_\_\_ % of investment.

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

C. Total Investment (depreciable value) \$ 116,000

D. Average Annual Investment . . . . . \$ 92,800 /yr.



9353.3 - PRODUCTION COSTS  
Schedule 20

IV. Fixed Cost (per hour of availability . . . . . \$ 9.37 /hr.  
(based on 1600 hours of annual machine availability

- A. Depreciation . . . . . \$ 7.25
- B. Insurance (rate 1.25 % of ave. ann. Invest.) \$ .73  
Annual cost of \$ 1160.
- C. Property Taxes (rate 2.4 % of ave. ann. invest.) \$ 1.39  
Annual cost of \$ 2227.

V. Operating Cost (per hour of operation) . . . . . \$ 6.66

- A. Fuel (diesel - ~~gas~~) . . \$ 2.47 /hr.  
6.5 gal. per hour for \$ .38 per gal.
- B. Oil and Grease . . . . . \$ 0.37 /hr. (15% of fuel costs)  
Lube oil - Crankcase \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Trans. & Drive \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Hyd. Oil \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Grease- \_\_\_\_\_ lbs. per hr. @ \$ \_\_\_\_\_ per lbs.  
Filters- \$ \_\_\_\_\_ per hr.
- C. Repairs and Maintenance . . . . . \$ 3.62 /hr.  
50 % of depreciation
- D. Tires . . . . . \$ 0.20 /hr.  
\$ 3240 total cost @ "16000" hrs. of tire life.

E. Other (Specify TIRES  
DRIVERS :

12.00-x 20 (16) PLY.--1 Complete Set = 8 tires per set  
Tire price discounted includes tax=\$300.00  
Tube " " " " = \$ 30.00  
\$330.00 Each x 8 tires =2640

FRONT TIRES

15.00 x 22.5 16-Ply Tubeless--1 Complete set= 2 Tires/Set  
Tire price discounted includes tax = \$300.00 Each x 2 tires= \$600

9353.3 - PRODUCTION COSTS  
Schedule 20

Machine Operating Rates

Item No. 12

I Description FRONT END LOG LOADER - RUBBER TIRED  
CATERPILLAR 966C 170 FLYWHEEL H.P. POWERSHIFT EQUIPPED FOR  
LOGGING-W/HYDRO LOG FORK LIFT. ALL WEATHER CAB.

II	<u>Rate</u>	<u>Ownership</u>	<u>Rental</u> <sup>1/</sup>
A.	Fixed ...	\$ <u>5.54</u> /hr.	\$ _____ /hr.
B.	Operating \$	<u>7.90</u> /hr.	\$ _____ /hr.
	Total . . . . .	\$ <u>13.44</u> /hr.	\$ _____ /hr.
		. . . . . \$ <u>.22</u> /min.	\$ _____ /min.

<sup>1/</sup> Based on schedule \_\_\_\_\_

III Investment

A. Acquisition (freight included)

Basic Machine . . . . . \$ 85,784

Attachments \_\_\_\_\_

\_\_\_\_\_ \$ \_\_\_\_\_

B. Residual Value (total) . . . . . \$ 17,157

TOTAL MACHINE based on 20 % of investment

for 16,000 hrs. of (useful life-first depreciable  
period)

\_\_\_\_\_ based on \_\_\_\_\_ % of investment.

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

C. Total Investment (depreciable value) \$ 68,627

D. Average Annual Investment . . . . . \$ 54,902 /yr.

9353.3 - PRODUCTION COSTS

Schedule 20

IV Fixed Cost (per hour of availability . . . . . \$ 5.54 /hr.  
(based on 1600 hours of annual machine availability)

A. Depreciation . . . . . \$ 4.29

B. Insurance (rate 1.25 % of ave. ann. invest.) \$ .43  
Annual cost of \$ 686.27

C. Property Taxes (rate 2.4 % of ave.ann.invest) \$ .82  
Annual cost of \$ 1317.64

V Operating Cost(per hour of operation) . . . . . \$ 7.90

A. Fuel (diesel - ~~gas~~) . . . \$ 2.36 /hr.  
6.2 gal. per hour for \$ 0.38 per gal.

B. Oil and Grease . . . . . \$ 0.33 /hr.  
Lube oil - Crankcase .10 gph @ \$ 1.84 per gal.  
Trans. & Drive .04 gph @ \$ 1.84 per gal.  
Hyd. Oil .04 gph @ \$ 1.83 per gal.  
Grease .04 lbs. per hr. @ \$ .37 per lbs.  
Filters \$.065 per hr.

C. Repairs and Maintenance . . . . . \$ 3.86 /hr.  
90 % of depreciation

D. Tires . . . . . \$ 1.28 /hr.  
\$20.422 total cost @ "16,000" hrs. of tire life.

E. Other (specify)  
TIRES  
Use 23.5 x 25(16 ply) = \$1279/tire  
2 sets of 4 @ \$1279/tire=..... \$10232  
Recaps 4 sets of 4 @\$640/tire=..... \$10240  
\$20472

VI Remarks \$20472 ÷ 16000 hrs.=\$1.28/hr.

9353.3 - PRODUCTION COSTS  
Schedule 20

Machine Operating Rates

Item No. 13

I Description LIGHT (MISC.USE) CRAWLER TRACTOR  
CATERPILLAR D6C WITH DOZER BLADE & WINCH  
\_\_\_\_\_  
\_\_\_\_\_

II	<u>Rate</u>	<u>Ownership</u>	<u>Rental</u> <sup>1/</sup>
A.	Fixed ...	\$ <u>9.49</u> /hr.	\$ _____ /hr.
B.	Operating \$	<u>9.11</u> /hr.	\$ _____ /hr.
	Total . . . . .	\$ <u>18.60</u> /hr.	\$ _____ /hr.
		\$ <u>.31</u> /min.	\$ _____ /min.

<sup>1/</sup> Based on schedule \_\_\_\_\_

III Investment

A. Acquisition (freight included)

Basic Machine . . . . . \$ 82,469

Attachments TOTAL

\_\_\_\_\_ \$ \_\_\_\_\_

B. Residual Value (total) . . . . . \$ 16,469

TOTAL MACHINE based on 20 % of investment

for 8,400 hrs. of (useful life-first depreciable  
period)

\_\_\_\_\_ based on \_\_\_\_\_ % of investment.

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

C. Total Investment (depreciable value) \$ 65,975

D. Average Annual Investment . . . . . \$ 54,181 /yr.



9353.3 - PRODUCTION COSTS

Schedule 20

IV Fixed Cost (per hour of availability . . . . . \$ 9.49 /hr.  
(based on 1200 hours of annual machine availability)

A. Depreciation . . . . . \$ 7.85

B. Insurance (rate 1.25 % of ave. ann. invest.) \$ 0.56  
Annual cost of \$ 677.

C. Property Taxes (rate 2.4 % of ave.ann.invest) \$ 1.08  
Annual cost of \$ 1300.

V Operating Cost(per hour of operation) . . . . . \$ 9.11

A. Fuel (diesel - ~~gas~~) . . . \$ 1.33 /hr.  
3.5 gal. per hour for \$ 0.38 per gal.

B. Oil and Grease . . . . . \$ 0.23 /hr.  
Lube oil - Crankcase .04 gph @ \$ 1.84 per gal.  
Trans. & Drive .02 gph @ \$ 1.84 per gal.  
Hyd. Oil .02 gph @ \$ 1.83 per gal.  
Grease-.05lbs. per hr. @ \$ .35 per lbs.  
Filters-\$.06 per hr.

C. Repairs and Maintenance . . . . . \$ 7.06 /hr.  
90 % of depreciation

D. Tires . . . . . \$ \_\_\_\_\_ /hr.  
\$ \_\_\_\_\_ total cost @ " \_\_\_\_\_ " hrs. of tire life.

E. Other (specify)

Towing cables: Replace 7 times during depreciation period  
200' @ \$0.69/Ft. x 7 replacements = \$966 ÷ 8400 hrs.=\$0.11/hr.

VI Remarks

9353.3 - PRODUCTION COSTS  
Schedule 20

Machine Operating Rates

Item No. 14

I Description TRACTOR MOUNTED DOZER  
CATERPILLAR D8K POWER SHIFT 8U DOZER  
WITH TILT CYLINDER, 8D RIPPER W/2 SHANKS  
"READY FOR ROAD BUILDING"

II	<u>Rate</u>	<u>Ownership</u>	<u>Rental</u> <sup>1/</sup>
A.	Fixed ...	\$ <u>17.25</u> /hr.	\$ _____ /hr.
B.	Operating	\$ <u>19.91</u> /hr.	\$ _____ /hr.
	Total . . . . .	\$ <u>37.16</u> /hr.	\$ _____ /hr.
		. . . . . \$ <u>.62</u> /min.	\$ _____ /min.
	1/ Based on schedule _____		

III Investment

A. Acquisition (freight included)

Basic Machine . . . . . \$ 157,065

Attachments COMPLETE

\_\_\_\_\_ \$ \_\_\_\_\_

B. Residual Value (total) . . . . . \$ 39,266

TOTAL MACHINE based on 25 % of investment

for 8400 hrs. of (useful life-first depreciable period)

\_\_\_\_\_ based on \_\_\_\_\_ % of investment.

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

C. Total Investment (depreciable value) \$ 117,799

D. Average Annual Investment . . . . . \$ 106,577 /yr.

9353.3 - PRODUCTION COSTS

Schedule 20

- IV Fixed Cost (per hour of availability . . . . . \$ 17.25 /hr.  
(based on 1200 hours of annual machine availability)
- A. Depreciation . . . . . \$ 14.02
- B. Insurance (rate 1.25 % of ave. ann. invest.) \$ 1.10  
Annual cost of \$ 1332
- C. Property Taxes (rate 2.4 % of ave.ann.invest) \$ 2.13  
Annual cost of \$ 2558
- V Operating Cost(per hour of operation) . . . . . \$ 19.91
- A. Fuel (diesel - ~~gas~~) . . . \$ 3.95 /hr.  
10.4 gal. per hour for \$ 0.38 per gal.
- B. Oil and Grease . . . . . \$ 0.29 /hr.  
Lube oil - Crankcase .07 gph @ \$ 1.84 per gal.  
Trans. & Drive .05 gph @ \$ 1.84 per gal.  
Hyd. Oil .03 gph @ \$ 1.83 per gal.  
Grease-.05 lbs. per hr. @ \$ .37 per lbs.  
Filters-\$.16 per hr.
- C. Repairs and Maintenance . . . . . \$ 10.09 /hr.  
60 % of depreciation
- D. Tires . . . . . \$ \_\_\_\_\_ /hr.  
\$ \_\_\_\_\_ total cost @ " \_\_\_\_\_ " hrs. of tire life.
- E. Other (specify)  
CUTTING EDGES: 3 replacements every 1000 hrs.  
21 replacement-- 1 5/8" heavy heavy duty edges @ \$154.88 ea.  
21 x \$154.88=\$4181.76 ÷ 8400 hrs.=\$3.87/hr.
- END BITS  
Hot coupling heavy heavy duty
- VI Remarks 2 replaced every 1000 hrs.=14 bits @ \$102.49 ea.  
14 x \$102.49= \$1434.86  
\$1434.86 ÷ 8400 hrs.= \$1.71/hr.

9353.3 - PRODUCTION COSTS  
Schedule 20

Machine Operating Rates

Item No. 15

I Description FRONT END (BUCKET) LOADER--RUBBER TIRED

CATERPILLAR: 950--130 FLYWHEEL H.P.--2 to 2½ CU.YARD

II	<u>Rate</u>	<u>Ownership</u>	<u>Rental</u> <sup>1/</sup>
A.	Fixed ... \$	_____ /hr.	\$ _____ /hr.
B.	Operating \$	_____ /hr.	\$ _____ /hr.
	Total . . . . . \$	_____ /hr.	\$ 26.60/hr.
		_____ /min.	\$ 0.443 /min.

1/ Based on Schedule Oregon State Highway Division  
Rental rates for equipment 11/1/75

III Investment

A. Acquisition (freight included)

Basic Machine . . . . . \$ \_\_\_\_\_

Attachments \_\_\_\_\_

\_\_\_\_\_ \$ \_\_\_\_\_

B. Residual Value (total) . . . . . \$ \_\_\_\_\_

\_\_\_\_\_ based on \_\_\_\_\_ % of investment

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

\_\_\_\_\_ based on \_\_\_\_\_ % of investment.

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

C. Total Investment (depreciable value) \$ \_\_\_\_\_

D. Average Annual Investment . . . . . \$ \_\_\_\_\_ /yr.



9353.3 - PRODUCTION COSTS

IV Fixed Cost (per hour of availability . . . . . \$ \_\_\_\_\_/hr.  
(based on \_\_\_\_\_ hours of annual machine availability)

A. Depreciation . . . . . \$ \_\_\_\_\_

B. Insurance (rate \_\_\_\_\_ % of ave. ann. invest.) \$ \_\_\_\_\_  
Annual cost of \$ \_\_\_\_\_.

C. Property Taxes (rate \_\_\_\_\_ % of ave.ann.invest) \$ \_\_\_\_\_  
Annual cost of \$ \_\_\_\_\_.

V Operating Cost(per hour of operation) . . . . . \$ \_\_\_\_\_

A. Fuel (diesel - gas) . . . \$ \_\_\_\_\_/hr.  
\_\_\_\_\_ gal. per hour for \$ \_\_\_\_\_ per gal.

B. Oil and Grease . . . . . \$ \_\_\_\_\_/hr.  
Lube oil - Crankcase \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Trans. & Drive \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Hyd. Oil \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Grease- \_\_\_\_\_ lbs. per hr. @ \$ \_\_\_\_\_ per lbs.  
Filters- \$ \_\_\_\_\_ per hr.

C. Repairs and Maintenance . . . . . \$ \_\_\_\_\_/hr.  
\_\_\_\_\_ % of depreciation

D. Tires . . . . . \$ \_\_\_\_\_/hr.  
\$ \_\_\_\_\_ total cost @ " \_\_\_\_\_ " hrs. of tire life.

E. Other (specify)

VI <sup>1/</sup>Remarks - (Note: All costs are included in rental rates.)

9353.3 - PRODUCTION COSTS  
Schedule 20

Machine Operating Rates

Item No. 16

- I Description AIR COMPRESSOR & DRILL 160 CFM  
PORTABLE COMPRESSOR -- 25 LB. JACKHAMMER (INCLUDES PIPES, HOSE,  
AND FITTINGS)--DRILL STEEL & BITS NOT FURNISHED WITH RENTAL RATE

II	<u>Rate</u>	<u>Ownership</u>		<u>Rental</u> <sup>1/</sup>
A.	Fixed ... \$	_____/hr. Compressor--		\$ <u>5.70</u> /hr.
		Hammer & Tamper--		\$ <u>1.10</u> /hr.
B.	Operating \$	_____/hr. Steel & Bits-		\$ <u>.96</u> /hr.
	Total . . . . . \$	_____/hr.		\$ <u>7.76</u> /hr.
	. . . . . \$	_____/min.		\$ <u>.129</u> /min.

1/ Based on schedule Oregon State Highway Division  
Rental Rates For Equipment 11/1/75

III Investment

- A. Acquisition (freight included)
- Basic Machine . . . . . \$ \_\_\_\_\_
- Attachments \_\_\_\_\_
- \_\_\_\_\_ \$ \_\_\_\_\_
- B. Residual Value (total) . . . . . \$ \_\_\_\_\_
- \_\_\_\_\_ based on \_\_\_\_\_ % of investment
- for \_\_\_\_\_ hrs. of (useful life-first depreciable period)
- \_\_\_\_\_ based on \_\_\_\_\_ % of investment.
- for \_\_\_\_\_ hrs. of (useful life-first depreciable period)
- C. Total Investment (depreciable value) \$ \_\_\_\_\_
- D. Average Annual Investment . . . . . \$ \_\_\_\_\_ /yr.

9353.3 - PRODUCTION COSTS  
Schedule 20

IV Fixed Cost (per hour of availability . . . . . \$ \_\_\_\_\_/hr.  
(based on \_\_\_\_\_ hours of annual machine availability)

A. Depreciation . . . . . \$ \_\_\_\_\_

B. Insurance (rate \_\_\_\_\_ % of ave. ann. invest.) \$ \_\_\_\_\_  
Annual cost of \$ \_\_\_\_\_.

C. Property Taxes (rate \_\_\_\_\_ % of ave.ann.invest) \$ \_\_\_\_\_  
Annual cost of \$ \_\_\_\_\_.

V Operating Cost(per hour of operation) . . . . . \$ \_\_\_\_\_

A. Fuel (diesel - gas) . . . \$ \_\_\_\_\_/hr.  
\_\_\_\_\_ gal. per hour for \$ \_\_\_\_\_ per gal.

B. Oil and Grease . . . . . \$ \_\_\_\_\_/hr.  
Lube oil - Crankcase \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Trans. & Drive \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Hyd. Oil \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Grease- \_\_\_\_\_ lbs. per hr. @ \$ \_\_\_\_\_ per lbs.  
Filters- \$ \_\_\_\_\_ per hr.

C. Repairs and Maintenance . . . . . \$ \_\_\_\_\_/hr.  
\_\_\_\_\_ % of depreciation

D. Tires . . . . . \$ \_\_\_\_\_/hr.  
\$ \_\_\_\_\_ total cost @ " \_\_\_\_\_ " hrs. of tire life.

E. Other (specify)

Steel; 1"x2', 1"x4', 1"x6', 1"x8' Total cost family of steel rods=\$128.25  
Replace every 160 hrs.-\$128.25÷160 hrs.=\$.80/Hr.

Bits; 1 3/4"=\$21.10 ea. & resharpen once (Cost \$4.15 for resharpening)=\$25.60  
Replace every 160 hrs.= \$25.60÷160 HRS=\$0.16/hr.

VI Remarks

Total for steel & bits = \$0.80/hr + \$0.16/hr =\$0.96/hr.

9353.3 - PRODUCTION COSTS  
Schedule 20

Machine Operating Rates

Item No. 17

- I Description AIR COMPRESSOR & TRACK DRILL 600 CFM  
PORTABLE COMPRESSOR--3½" TRACK MOUNTED DRILL (INCLUDES PIPE, HOSE,  
AND FITTINGS)- DRILL STEEL AND BITS NOT FURNISHED WITH RENTAL RATE

II	<u>Rate</u>	<u>Ownership</u>	<u>Rental</u> <sup>1/</sup>
A.	Fixed ... \$	_____ /hr.	Compressor-- \$ 21.15/hr. Track Drill-- 20.65/hr.
B.	Operating \$	_____ /hr.	Steel & Bits- \$ 2.96/hr.
	Total . . . . . \$	_____ /hr.	\$ 44.76/hr.
		_____ /min.	\$ 0.746/min.

<sup>1/</sup> Based on ~~schedule~~ Oregon State highway Division  
Rental Rates For Equipment 11/1/75

III Investment

- A. Acquisition (freight included)  
Basic Machine . . . . . \$ \_\_\_\_\_  
Attachments \_\_\_\_\_  
\_\_\_\_\_ \$ \_\_\_\_\_
- B. Residual Value (total) . . . . . \$ \_\_\_\_\_  
\_\_\_\_\_ based on \_\_\_\_\_ % of investment  
for \_\_\_\_\_ hrs. of (useful life-first depreciable  
period)  
\_\_\_\_\_ based on \_\_\_\_\_ % of investment.  
for \_\_\_\_\_ hrs. of (useful life-first depreciable period)
- C. Total Investment (depreciable value) \$ \_\_\_\_\_
- D. Average Annual Investment . . . . . \$ \_\_\_\_\_ /yr.



9353.3 - PRODUCTION COSTS  
Schedule 20

IV Fixed Cost (per hour of availability . . . . . \$ \_\_\_\_\_/hr.  
(based on \_\_\_\_\_ hours of annual machine availability)

A. Depreciation . . . . . \$ \_\_\_\_\_

B. Insurance (rate \_\_\_\_\_ % of ave. ann. invest.) \$ \_\_\_\_\_  
Annual cost of \$ \_\_\_\_\_.

C. Property Taxes (rate \_\_\_\_\_ % of ave.ann.invest) \$ \_\_\_\_\_  
Annual cost of \$ \_\_\_\_\_.

V Operating Cost(per hour of operation) . . . . . \$ \_\_\_\_\_

A. Fuel (diesel - gas) . . . \$ \_\_\_\_\_/hr.  
\_\_\_\_\_ gal. per hour for \$ \_\_\_\_\_ per gal.

B. Oil and Grease . . . . . \$ \_\_\_\_\_/hr.  
Lube oil - Crankcase \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Trans. & Drive \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Hyd. Oil \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Grease- \_\_\_\_\_ lbs. per hr. @ \$ \_\_\_\_\_ per lbs.  
Filters-\$ \_\_\_\_\_ per hr.

C. Repairs and Maintenance . . . . . \$ \_\_\_\_\_/hr.  
\_\_\_\_\_ % of depreciation

D. Tires . . . . . \$ \_\_\_\_\_/hr.  
\$ \_\_\_\_\_ total cost @ " \_\_\_\_\_ " hrs. of tire life.

E. Other (specify)

Steel-spiral rod; 1½" x 12' @ \$99.50 ea. replace every 96hrs.;  
\$99.50 ÷ 96 hrs.= \$1.04/hr.

Bits--3½" @ \$92.10 ea. replace every 48 hrs.;  
\$92.10 ÷ 48 hrs.= \$1.92/hr.  
TOTAL= \$2.96/hr.

VI Remarks

9353.3 - PRODUCTION COSTS  
Schedule 20

Machine Operating Rates

Item No. 18

I Description MOTOR SCRAPER  
TWO WHEEL PRIME MOVER  
SINGLE ENGINE TRACTOR  
12 TO 19 CU. YARDS (STRUCK MEA.) CAPACITY

II	<u>Rate</u>	<u>Ownership</u>	<u>Rental</u> <sup>1/</sup>
A.	Fixed ... \$	_____ /hr.	\$ _____ /hr.
B.	Operating \$	_____ /hr.	\$ _____ /hr.
	Total . . . . . \$	_____ /hr.	\$41.60 /hr.
	. . . . . \$	_____ /min.	\$0.693 /min.

<sup>1/</sup> Based on ~~schedule~~ Oregon State Highway Division  
Rental rates for equipment. 11/1/75

III Investment

A. Acquisition (freight included)

Basic Machine . . . . . \$ \_\_\_\_\_

Attachments \_\_\_\_\_

\_\_\_\_\_ \$ \_\_\_\_\_

B. Residual Value (total) . . . . . \$ \_\_\_\_\_

\_\_\_\_\_ based on \_\_\_\_\_ % of investment

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

\_\_\_\_\_ based on \_\_\_\_\_ % of investment.

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

C. Total Investment (depreciable value) \$ \_\_\_\_\_

D. Average Annual Investment . . . . . \$ \_\_\_\_\_ /yr.

9353.3 - PRODUCTION COSTS  
Schedule 20

- IV Fixed Cost (per hour of availability . . . . . \$ \_\_\_\_\_/hr.  
(based on \_\_\_\_\_ hours of annual machine availability)
- A. Depreciation . . . . . \$ \_\_\_\_\_
- B. Insurance (rate \_\_\_\_\_ % of ave. ann. invest.) \$ \_\_\_\_\_  
Annual cost of \$ \_\_\_\_\_.
- C. Property Taxes (rate \_\_\_\_\_ % of ave.ann.invest) \$ \_\_\_\_\_  
Annual cost of \$ \_\_\_\_\_.
- V Operating Cost(per hour of operation) . . . . . \$ \_\_\_\_\_
- A. Fuel (diesel - gas) . . . \$ \_\_\_\_\_/hr.  
\_\_\_\_\_ gal. per hour for \$ \_\_\_\_\_ per gal.
- B. Oil and Grease . . . . . \$ \_\_\_\_\_/hr.  
Lube oil - Crankcase \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Trans. & Drive \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Hyd. Oil \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Grease-\_\_\_\_\_ lbs. per hr. @ \$ \_\_\_\_\_ per lbs.  
Filters-\$ \_\_\_\_\_ per hr.
- C. Repairs and Maintenance . . . . . \$ \_\_\_\_\_/hr.  
\_\_\_\_\_ % of depreciation
- D. Tires . . . . . \$ \_\_\_\_\_/hr.  
\$ \_\_\_\_\_ total cost @ " \_\_\_\_\_ " hrs. of tire life.
- E. Other (specify)

VI Remarks

9353.3 - PRODUCTION COSTS  
Schedule 20

Machine Operating Rates

Item No. 19

I Description SHOVEL -- POWER  
3/4 CUBIC YARD CAPACITY

II	<u>Rate</u>	<u>Ownership</u>	<u>Rental</u> <sup>1/</sup>
A.	Fixed ... \$	_____/hr.	\$ ____/hr.
B.	Operating \$	_____/hr.	\$ ____/hr.
	Total . . . . . \$	_____/hr.	\$ <u>25.80</u> /hr.
	. . . . . \$	_____/min.	\$ <u>0.43</u> /min.

1/ Based on schedule Oregon State Highway Division  
Rental Rates For Equipment 11/1/75

III Investment

A. Acquisition (freight included)

Basic Machine . . . . . \$ \_\_\_\_\_

Attachments \_\_\_\_\_

\_\_\_\_\_ \$ \_\_\_\_\_

B. Residual Value (total) . . . . . \$ \_\_\_\_\_

\_\_\_\_\_ based on \_\_\_\_\_ % of investment

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

\_\_\_\_\_ based on \_\_\_\_\_ % of investment.

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

C. Total Investment (depreciable value) \$ \_\_\_\_\_

D. Average Annual Investment . . . . . \$ \_\_\_\_\_/yr.



9353.3 - PRODUCTION COSTS

- IV Fixed Cost (per hour of availability . . . . . \$ \_\_\_\_\_/hr.  
(based on \_\_\_\_\_ hours of annual machine availability)
- A. Depreciation . . . . . \$ \_\_\_\_\_
- B. Insurance (rate \_\_\_\_\_ % of ave. ann. invest.) \$ \_\_\_\_\_  
Annual cost of \$ \_\_\_\_\_.
- C. Property Taxes (rate \_\_\_\_\_ % of ave.ann.invest) \$ \_\_\_\_\_  
Annual cost of \$ \_\_\_\_\_.
- V Operating Cost(per hour of operation) . . . . . \$ \_\_\_\_\_
- A. Fuel (diesel - gas) . . . \$ \_\_\_\_\_/hr.  
\_\_\_\_\_ gal. per hour for \$ \_\_\_\_\_ per gal.
- B. Oil and Grease . . . . . \$ \_\_\_\_\_/hr.  
Lube oil - Crankcase \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Trans. & Drive \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Hyd. Oil \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Grease-\_\_\_\_\_ lbs. per hr. @ \$ \_\_\_\_\_ per lbs.  
Filters-\$ \_\_\_\_\_ per hr.
- C. Repairs and Maintenance . . . . . \$ \_\_\_\_\_/hr.  
\_\_\_\_\_ % of depreciation
- D. Tires . . . . . \$ \_\_\_\_\_/hr.  
\$ \_\_\_\_\_ total cost @ " \_\_\_\_\_ " hrs. of tire life.
- E. Other (specify)

VI Remarks - <sup>1/</sup> (Note: All costs are included in rental rates.)

9353.3 - PRODUCTION COSTS  
Schedule 20

Machine Operating Rates

Item No. 20

I Description DUMP TRUCK -- NORMAL DUTY  
2 OR 3 AXLE - GASOLINE OR DIESEL (HIGHWAY)  
8 To 12 CUBIC YARD (STRUCK MEASURE)

II Rate

	<u>Ownership</u>	<u>Rental</u> <sup>1/</sup>
A. Fixed ... \$	_____/hr.	\$ ____/hr.
B. Operating \$	_____/hr.	\$ ____/hr.
Total . . . . . \$	_____/hr.	\$ 22.45/hr.
	_____/min.	\$ .374/min.

<sup>1/</sup> Based on schedule Oregon State Highway Division  
Rental Rates For Equipment 11/1/75

III Investment

A. Acquisition (freight included)

Basic Machine . . . . . \$ \_\_\_\_\_

Attachments \_\_\_\_\_

\_\_\_\_\_ \$ \_\_\_\_\_

B. Residual Value (total) . . . . . \$ \_\_\_\_\_

\_\_\_\_\_ based on \_\_\_\_\_ % of investment

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

\_\_\_\_\_ based on \_\_\_\_\_ % of investment.

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

C. Total Investment (depreciable value) \$ \_\_\_\_\_

D. Average Annual Investment . . . . . \$ \_\_\_\_\_/yr.

9353.3 - PRODUCTION COSTS

IV Fixed Cost (per hour of availability . . . . . \$ \_\_\_\_\_/hr.  
(based on \_\_\_\_\_ hours of annual machine availability)

A. Depreciation . . . . . \$ \_\_\_\_\_

B. Insurance (rate \_\_\_\_\_ % of ave. ann. invest.) \$ \_\_\_\_\_  
Annual cost of \$ \_\_\_\_\_.

C. Property Taxes (rate \_\_\_\_\_ % of ave.ann.invest) \$ \_\_\_\_\_  
Annual cost of \$ \_\_\_\_\_.

V Operating Cost(per hour of operation) . . . . . \$ \_\_\_\_\_

A. Fuel (diesel - gas) . . . \$ \_\_\_\_\_/hr.  
\_\_\_\_\_ gal. per hour for \$ \_\_\_\_\_ per gal.

B. Oil and Grease . . . . . \$ \_\_\_\_\_/hr.  
Lube oil - Crankcase \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Trans. & Drive \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Hyd. Oil \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Grease-\_\_\_\_\_ lbs. per hr. @ \$ \_\_\_\_\_ per lbs.  
Filters-\$ \_\_\_\_\_ per hr.

C. Repairs and Maintenance . . . . . \$ \_\_\_\_\_/hr.  
\_\_\_\_\_ % of depreciation

D. Tires . . . . . \$ \_\_\_\_\_/hr.  
\$ \_\_\_\_\_ total cost @ " \_\_\_\_\_ " hrs. of tire life.

E. Other (specify)

VI Remarks - 1/  
(Note: All costs are included in rental rates.)

9353.3 - PRODUCTION COSTS  
Schedule 20

Machine Operating Rates

Item No. 21

I Description ROAD ROLLER--VIBRATOR  
GASOLINE OR DIESEL--27 To 36 H.P.

II	<u>Rate</u>	<u>Ownership</u>	<u>Rental</u> <sup>1/</sup>
A.	Fixed ... \$	_____ /hr.	\$ _____ /hr.
B.	Operating \$	_____ /hr.	\$ _____ /hr.
	Total . . . . . \$	_____ /hr.	\$ <u>14.70</u> /hr.
		_____ /min.	\$ <u>.245</u> /min.

1/ Based on ~~Schedule~~ Oregon State Highway Division  
Rental Rates For Equipment 11/1/75

III Investment

A. Acquisition (freight included)

Basic Machine . . . . . \$ \_\_\_\_\_

Attachments \_\_\_\_\_

\_\_\_\_\_ \$ \_\_\_\_\_

B. Residual Value (total) . . . . . \$ \_\_\_\_\_

\_\_\_\_\_ based on \_\_\_\_\_ % of investment

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

\_\_\_\_\_ based on \_\_\_\_\_ % of investment.

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

C. Total Investment (depreciable value) \$ \_\_\_\_\_

D. Average Annual Investment . . . . . \$ \_\_\_\_\_ /yr.



9353.3 - PRODUCTION COSTS

- IV Fixed Cost (per hour of availability . . . . . \$ \_\_\_\_\_/hr.  
(based on \_\_\_\_\_ hours of annual machine availability)
- A. Depreciation . . . . . \$ \_\_\_\_\_
- B. Insurance (rate \_\_\_\_\_ % of ave. ann. invest.) \$ \_\_\_\_\_  
Annual cost of \$ \_\_\_\_\_
- C. Property Taxes (rate \_\_\_\_\_ % of ave.ann.invest) \$ \_\_\_\_\_  
Annual cost of \$ \_\_\_\_\_
- V Operating Cost(per hour of operation) . . . . . \$ \_\_\_\_\_
- A. Fuel (diesel - gas) . . . \$ \_\_\_\_\_/hr.  
\_\_\_\_\_ gal. per hour for \$ \_\_\_\_\_ per gal.
- B. Oil and Grease . . . . . \$ \_\_\_\_\_/hr.  
Lube oil - Crankcase \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Trans. & Drive \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Hyd. Oil \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Grease-\_\_\_\_\_ lbs. per hr. @ \$ \_\_\_\_\_ per lbs.  
Filters-\$ \_\_\_\_\_ per hr.
- C. Repairs and Maintenance . . . . . \$ \_\_\_\_\_/hr.  
\_\_\_\_\_ % of depreciation
- D. Tires . . . . . \$ \_\_\_\_\_/hr.  
\$ \_\_\_\_\_ total cost @ " \_\_\_\_\_ " hrs. of tire life.
- E. Other (specify)
- VI Remarks - (Note: All costs are included in rental rates.)
- 1/

9353.3 - PRODUCTION COSTS  
Schedule 20

Machine Operating Rates

Item No. 22

I Description ROAD ROLLER--GRID 16 TON  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

II	<u>Rate</u>	<u>Ownership</u>	<u>Rental</u> <sup>1/</sup>
A.	Fixed ... \$	_____/hr.	\$ ____/hr.
B.	Operating \$	_____/hr.	\$ ____/hr.
	Total . . . . . \$	_____/hr.	\$ 9.30 /hr.
	. . . . . \$	_____/min.	\$ .155/min.

1/ Based on ~~schedule~~ Oregon State Highway Division  
Rental Rates For Equipment 11/1/75

III Investment

A. Acquisition (freight included)

Basic Machine . . . . . \$ \_\_\_\_\_

Attachments \_\_\_\_\_

\_\_\_\_\_ \$ \_\_\_\_\_

B. Residual Value (total) . . . . . \$ \_\_\_\_\_

\_\_\_\_\_ based on \_\_\_\_\_ % of investment

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

\_\_\_\_\_ based on \_\_\_\_\_ % of investment.

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

C. Total Investment (depreciable value) \$ \_\_\_\_\_

D. Average Annual Investment . . . . . \$ \_\_\_\_\_/yr.

9353.3 - PRODUCTION COSTS

IV Fixed Cost (per hour of availability . . . . . \$ \_\_\_\_\_/hr.  
(based on \_\_\_\_\_ hours of annual machine availability)

A. Depreciation . . . . . \$ \_\_\_\_\_

B. Insurance (rate \_\_\_\_\_ % of ave. ann. invest.) \$ \_\_\_\_\_  
Annual cost of \$ \_\_\_\_\_.

C. Property Taxes (rate \_\_\_\_\_ % of ave.ann.invest) \$ \_\_\_\_\_  
Annual cost of \$ \_\_\_\_\_.

V Operating Cost(per hour of operation) . . . . . \$ \_\_\_\_\_

A. Fuel (diesel - gas) . . . \$ \_\_\_\_\_/hr.  
\_\_\_\_\_ gal. per hour for \$ \_\_\_\_\_ per gal.

B. Oil and Grease . . . . . \$ \_\_\_\_\_/hr.  
Lube oil - Crankcase \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Trans. & Drive \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Hyd. Oil \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Grease- \_\_\_\_\_ lbs. per hr. @ \$ \_\_\_\_\_ per lbs.  
Filters-\$ \_\_\_\_\_ per hr.

C. Repairs and Maintenance . . . . . \$ \_\_\_\_\_/hr.  
\_\_\_\_\_ % of depreciation

D. Tires . . . . . \$ \_\_\_\_\_/hr.  
\$ \_\_\_\_\_ total cost @ " \_\_\_\_\_ " hrs. of tire life.

E. Other (specify)

VI Remarks - <sup>1/</sup>(Note: All costs are included in rental rates.)

9353.3 - PRODUCTION COSTS  
Schedule 20

Machine Operating Rates

Item No. 23

I Description MOTOR GRADER  
CATERPILLER NO. 12F W/CAB  
COMPLETE-HYDRAULIC SIDESHIFT-MOLDING BOARD  
SCARIFIER LIGHTS & HD CUTTING EDGE

II	<u>Rate</u>	<u>Ownership</u>	<u>Rental</u> <sup>1/</sup>
A.	Fixed ...	\$ <u>4.41</u> /hr.	\$ _____ /hr.
B.	Operating	\$ <u>4.94</u> /hr.	\$ _____ /hr.
	Total . . . . .	\$ <u>9.35</u> /hr.	\$ _____ /hr.
		\$ <u>16</u> /min.	\$ _____ /min.

<sup>1/</sup> Based on schedule \_\_\_\_\_

III Investment

A. Acquisition (freight included)  
Basic Machine . . . . . \$ 71,209  
Attachments \_\_\_\_\_  
\$ \_\_\_\_\_  
B. Residual Value (total) . . . . . \$ 17,802  
TOTAL MACHINE based on 25 % of investment  
for 16,000 hrs. of (useful life-first-depreciable  
-period)  
based on \_\_\_\_\_ % of investment.  
for \_\_\_\_\_ hrs. of (useful life-first depreciable period)  
C. Total Investment (depreciable value) \$ 53,407  
D. Average Annual Investment . . . . . \$ 47,169 /yr.



9353.3 - PRODUCTION COSTS  
Schedule 20

IV. Fixed Cost (per hour of availability . . . . . \$ 4.41 /hr.  
(based on 1600 hours of annual machine availability

A. Depreciation . . . . . \$ 3.33

B. Insurance (rate 1.25 % of ave. ann. Invest.) \$ .37  
Annual cost of \$ 590.

C. Property Taxes (rate 2.4 % of ave. ann. invest.) \$ .71  
Annual cost of \$ 1132.

V. Operating Cost (per hour of operation) . . . . . \$ 4.94

A. Fuel (diesel - gas) . . \$ 1.74 /hr.  
4.6 gal. per hour for \$ .38 per gal.  
15% of

B. Oil and Grease Fuel Costs \$ .26 /hr.  
Lube oil - Crankcase \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Trans. & Drive \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Hyd. Oil \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Grease- \_\_\_\_\_ lbs. per hr. @ \$ \_\_\_\_\_ per lbs.  
Filters- \$ \_\_\_\_\_ per hr.

C. Repairs and Maintenance . . . . . \$ 2.00 /hr.  
60 % of depreciation

D. Tires . . . . . \$ 0.41 /hr.  
\$ 6581 total cost @ "16000" hrs. of tire life.

E. Other (Specify REPLACE EVERY 2 YRS.

REAR NEW: 13.00x24 (12 Ply)

Tire = \$233.41  
Tube = 26.21  
Tax = 9.44

\$269.06 x 20 Tires = 5381

FRONT RECAPPED TIRES

Tire = \$92.00  
Tube = 26.21  
Tax = 1.81

\$120.02  
x 10 Tires  
\$1200

VI Remarks END BITS 2@ 15.16 Ea. = \$30.32  
OVERLAYS 2@ 38.17 Ea. = 76.34  
CUTTING EDGES 2@ 49.63 Ea. = 99.26  
SCARIFIER TIPS 11@ 5.27 Ea. = 57.97

\$263.89 REPLACE EVERY 500 HOURS

\$263.89+ 500 hrs. + 0.53/hr.

9353.3 - PRODUCTION COSTS  
Schedule 20

Machine Operating Rates

Item No. 23A

I Description MOTOR GRADER WITH POWER SHIFT  
27,000 TO 31,000 LBS.  
\_\_\_\_\_  
\_\_\_\_\_

II	<u>Rate</u>	<u>Ownership</u>	<u>Rental</u> <sup>1/</sup>
A.	Fixed ... \$	_____/hr.	\$ ____/hr.
B.	Operating \$	_____/hr.	\$ ____/hr.
	Total . . . . . \$	_____/hr.	\$ <u>23.70/hr.</u>
	. . . . . \$	_____/min.	\$ <u>.375/min.</u>

<sup>1/</sup> Based on ~~schedule~~ Oregon State Highway Division  
Rental Rates For Equipment 11/1/75

III Investment

A. Acquisition (freight included)

Basic Machine . . . . . \$ \_\_\_\_\_

Attachments \_\_\_\_\_

\_\_\_\_\_ \$ \_\_\_\_\_

B. Residual Value (total) . . . . . \$ \_\_\_\_\_

\_\_\_\_\_ based on \_\_\_\_\_ % of investment

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

\_\_\_\_\_ based on \_\_\_\_\_ % of investment.

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

C. Total Investment (depreciable value) \$ \_\_\_\_\_

D. Average Annual Investment . . . . . \$ \_\_\_\_\_/yr.

9353.3 - PRODUCTION COSTS  
Schedule 20

IV Fixed Cost (per hour of availability . . . . . \$ \_\_\_\_\_/hr.  
(based on \_\_\_\_\_ hours of annual machine availability)

A. Depreciation . . . . . \$ \_\_\_\_\_

B. Insurance (rate \_\_\_\_\_ % of ave. ann. invest.) \$ \_\_\_\_\_  
Annual cost of \$ \_\_\_\_\_.

C. Property Taxes (rate \_\_\_\_\_ % of ave.ann.invest) \$ \_\_\_\_\_  
Annual cost of \$ \_\_\_\_\_.

V Operating Cost(per hour of operation) . . . . . \$ \_\_\_\_\_

A. Fuel (diesel - gas) . . . \$ \_\_\_\_\_/hr.  
\_\_\_\_\_ gal. per hour for \$ \_\_\_\_\_ per gal.

B. Oil and Grease . . . . . \$ \_\_\_\_\_/hr.  
Lube oil - Crankcase \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Trans. & Drive \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Hyd. Oil \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.  
Grease- \_\_\_\_\_ lbs. per hr. @ \$ \_\_\_\_\_ per lbs.  
Filters-\$ \_\_\_\_\_ per hr.

C. Repairs and Maintenance . . . . . \$ \_\_\_\_\_/hr.  
\_\_\_\_\_ % of depreciation

D. Tires . . . . . \$ \_\_\_\_\_/hr.  
\$ \_\_\_\_\_ total cost @ " \_\_\_\_\_ " hrs. of tire life.

E. Other (specify)

VI Remarks

9353.3 - PRODUCTION COSTS  
Schedule 20Machine Operating RatesItem No. 24

I Description LOG TRUCK W/TRAILER-WHITE WESTERN STAR  
MODEL 4964 - W/PEERLESS TRAILER-350 H.P. CUMMINS DIESEL -  
WITH ALL EQUIP. FOR SAFE OPERATION & READY TO LOG

II	<u>Rate</u>	<u>Ownership</u>	<u>Rental</u> <sup>1/</sup>
A.	Fixed ...	\$ <u>6.59</u> /hr.	\$ _____ /hr.
B.	Operating \$	<u>9.32</u> /hr.	\$ _____ /hr.
	Total . . . . .	\$ <u>15.91</u> /hr.	\$ _____ /hr.
		. . . . . \$ <u>.27</u> /min.	\$ _____ /min.

<sup>1/</sup> Based on schedule \_\_\_\_\_

III Investment

A. Acquisition (freight included)

Basic Machine . . . . . \$ 56,200Attachments TRAILER

\$ \_\_\_\_\_

B. Residual Value (total) . . . . . \$ 14,050TRUCK & TRAILER based on 25 % of investmentfor 10,000 hrs. of (useful life-first depreciable  
period)

\_\_\_\_\_ based on \_\_\_\_\_ % of investment.

for \_\_\_\_\_ hrs. of (useful life-first depreciable period)

C. Total Investment (depreciable value) \$ 42,150D. Average Annual Investment . . . . . \$ 39,340 /yr.



9353.3 - PRODUCTION COSTS  
Schedule 20

IV Fixed Cost (per hour of availability . . . . . \$ 6.59 /hr.  
(based on 2000 hours of annual machine availability)

A. Depreciation . . . . . \$ 4.21  
Commercial truck rate  
B. Insurance (rate ~~xxxxxxx~~ \$0.45 ~~xxxxxxx~~ xxxxxxx xxxxxxx) \$ 0.90  
Annual cost of \$ 1800  
C. License Fee Dept. Of Motor Vehicles . . . . . \$ 0.74  
Annual cost of \$ 1489.50

V Operating Cost(per hour of operation) . . . . . \$ 9.32

A. Fuel (diesel - ~~gas~~) . . . \$ 2.47 /hr.  
6.5 gal. per hour for \$ 0.38 per gal.  
B. Oil and Grease . . . . . \$ 0.12 /hr. (5% of fuel cost)  
Lube oil - Crankcase      gph @ \$      per gal.  
Trans. & Drive      gph @ \$      per gal.  
Hyd. Oil      gph @ \$      per gal.  
Grease      lbs. per hr. @ \$      per lbs.  
Filters-\$      per hr.  
C. Repairs and Maintenance . . . . . \$ 4.21 /hr.  
100 % of depreciation  
D. Tires . . . . . \$ 2.52 /hr.  
\$ 25,227 total cost @ "10,000" hrs. of tire life.  
E. Other (specify)

INSURANCE:

BI-P 100-300-300--\$459.60/Yr.  
Fire & Theft----- \$242.60  
Collision----- 1097.80  
\$1800.00/Yr. ÷ 2000hrs.= \$.90/Hr.

VI Remarks LICENSE FEES:

Truck 44,000lbs.=120.00/Yr.  
Trailer 34,000"= 80.00  
P.U.C. license plate= 2.50  
P.U.C. OPERating chgs=107.25/MO.x12=1287.00  
1489.50/Yr. --2000 Hrs.= \$0.74/Hr.  
--

9353.3 - PRODUCTION COSTS  
Schedule 20

### Machine Operating Rates

Item No. 25

I	Description	CREW CAR
---	-------------	----------

GMC-3/4 TON - 9 PASSENGER CARRYALL

"COMPLETE"

II Rate

### Ownership

Rental 1/

A. Fixed ... \$ .942 /hr. \$ /hr.

B. Operating \$ 1.312 /hr. \$ /hr.

Total . . . . . \$ 2.254 /hr.                  \$ \_\_\_\_\_ /hr.  
                       \$ .039 /min.                  \$ \_\_\_\_\_ /min.

1/ Based on schedule

### III Investment

A. Acquisition (freight included)

Basic Machine . . . . .	\$ 8,100
-------------------------	----------

Attachments COMPLETE

\$

B. Residual Value (total) . . . . . \$ 1.620

TOTAL                      based on 20 % of investment

for 10,000 hrs. of (useful life-first depreciable  
-period)

based on % of investment.

for hrs. of (useful life-first depreciable period)

C. Total Investment (depreciable value) \$ 6,480

D. Average Annual Investment . . . . . \$ 5,380 /yr.

9353.3 - PRODUCTION COSTS  
Schedule 20

IV. Fixed Cost (per hour of availability . . . . . \$ .942 /hr.  
(based on 1600 hours of annual machine availability)

A. Depreciation . . . . . \$ .648

Commercial Rates

1) B. Insurance (rate \_\_\_\_\_ % of ave. ann. Invest.) \$ .288  
Annual cost of \$ 461

License Fee D.M.V.

C. ~~Property Taxes~~ (rate \_\_\_\_\_ % of ave. ann. invest.) \$ .006  
Annual cost of \$ \$10 + 1600 hrs.

V. Operating Cost (per hour of operation) . . . . . \$ 1.312

A. Fuel (diesel - gas) . . . \$ .506 /hr.

3.75 gal. per hour for \$ 0.54 per gal.

B. Vehicle used 2 hrs/day: 7.5 gals x \$.54 = \$4.08 + 8 hrs = .506/hr.  
Oil and Grease . . . . . \$ .076 /hr (15% x Fuel Cost)

Lube oil - Crankcase \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.

Trans. & Drive \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.

Hyd. Oil \_\_\_\_\_ gph @ \$ \_\_\_\_\_ per gal.

Grease- \_\_\_\_\_ lbs. per hr. @ \$ \_\_\_\_\_ per lbs.

Filters- \$ \_\_\_\_\_ per hr.

C. Repairs and Maintenance . . . . . \$ .583 /hr.

90 % of depreciation

D. Tires . . . . . \$ .147 /hr.

\$ 1472 total cost @ "10000" hrs. of tire life.

E. Other (Specify

1) INSURANCE

Liability . . . . . \$148/yr.

Uninsured Motorist . . . 5

Collision . . . . . 209

Comprehensive . . . 99

\$461/Yr. + 1600 Hrs/Yr = 0.288/Hr.

9353.3 - PRODUCTION COSTS  
(Schedule 20)

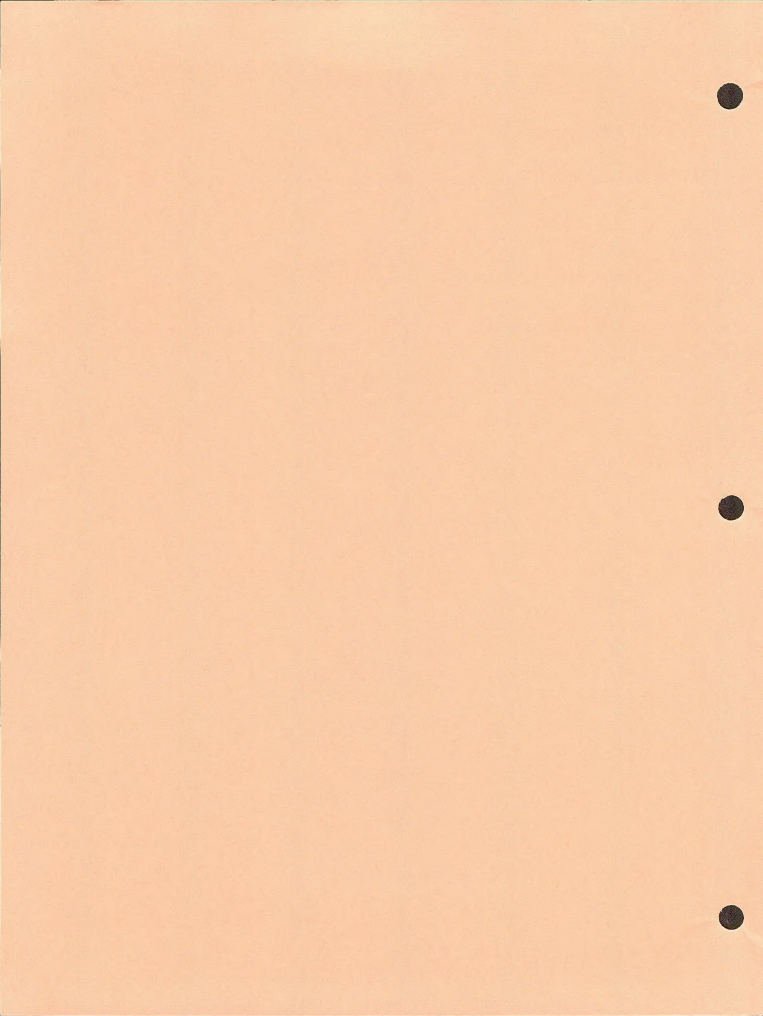
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C. Operating Costs

1. Procedure. The costs of various segments of each operation are combined to determine the total costs of performing this function. The fixed and operating costs rental rate of each machine are included. The wages for each employee contributing to the operation are added, along with the additional labor-related costs and cost of transportation to the job. In addition, ten percent of the total of all the costs is included to cover general and administrative costs, i.e., the costs of clerical work, accounting services, administration and overhead, etc.

2. Operating Cost Computations. The individual computations are summarized below. They are grouped by the major functions, and referenced to specific cost tables in the Schedule.





Activity - FALLING & BUCKING -WESTERN OREGON

Operations - MERCHANTABLE & UNMERCHANTABLE TREES

## I Determining Hourly Cost

B. <u>Wage Rates</u> (Adjusted Hourly Rate)			
	<u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1.	<u>FALLER-BUCKER</u>	<u>17.06</u>	<u>17.06</u>
2.	<u></u>	<u></u>	<u></u>
3.	<u></u>	<u></u>	<u></u>

9353.3; - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 17.06

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 18.39 X 10% . . . . . \$ 1.84

D. Total Costs . . . . . \$ 20.23

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 20.23

Per Minute \$ 0.337

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

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(C2a2)

Operating Cost Computations

Activity - FALLING & BUCKING - WESTERN OREGON

Operations - COMMERCIAL THINNINGS

Reference for Cost Table ILLUSTRATION 1 TABLE 5

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>CHAIN SAW</u>	<u>0.40</u>	<u>0.93</u>	<u>1.33</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
Total Machine Rate . . . \$			<u>1.33</u>

B. <u>Wage Rates</u> (Adjusted Hourly Rate) <u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1. <u>FALLING &amp; BUCKING-LABOR COST</u>	<u>13.65</u>	<u>13.65</u>
2. <u>-USE AVG. WAGE IN LIEU OF-</u> <u>FALLER BUCKER WAGES USED FOR</u>	_____	_____
3. <u>OTHER FALLING &amp; BUCKING COSTS.</u>	_____	_____



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 13.65

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 14.98 X 10% . . . . . \$ 1.50

D. Total Costs . . . . . \$ 16.48

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 16.48

Per Minute \$ 0.2747

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

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(C2a3)

Operating Cost Computations

Activity - FALLING & BUCKING - EASTERN OREGON

Operations UNMERCHANTABLE TREES & SNAGS

Reference for Cost Table ILLUSTRATION 1 TABLE 4

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>CHAIN SAW</u>	<u>0.40</u>	<u>0.93</u>	<u>1.33</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
Total Machine Rate . . .	\$		<u>1.33</u>

B. <u>Wage Rates</u> (Adjusted Hourly Rate) <u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1. <u>FALLER-BUCKER</u>	<u>14.92</u>	<u>14.92</u>
2. _____	_____	_____
3. _____	_____	_____

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 14.92

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 16.25 X 10% . . . . . \$ 1.63

D. Total Costs . . . . . \$ 17.88

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Costs

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 17.88

Per Minute \$ 0.298

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - EQUIPMENT MOVE-IN (1) LIGHT YARDING TRACTOR

Reference for Cost Table ILLUSTRATION 2 TABLE 1

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> <u>Machine/Time</u>			
1.	<u>TRACTOR CAT D4D</u> <u>2 HOUR DELAY</u>	<u>2x4.64</u>		<u>9.28</u>
2.	<u>HEAVY WEIGHT FLATBED</u> <u>FOR HAULING TRACTOR - 3HRS.</u> <u>RENTAL RATE FROM O.S.H.WY SCH.</u>	<u>3x9.55</u>		<u>28.65</u>
3.				
4.				
5.				
6.				
Total Machine Rate . . .		\$		<u>37.93</u>

B.	<u>Wage Rates (Adjusted Hourly Rate)</u> <u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1.	<u>SMALL TRACTOR OPERATOR</u>	<u>3x13.82</u>	<u>41.46</u>
2.			
3.			



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 41.46

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 79.39 X 10% . . . . . \$ 7.94

D. Total Costs . . . . . \$ 89.13

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 90.00

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20.

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(C2b1)

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - EQUIPMENT MOVE-IN (2) YARDING TRACTOR

Reference for Cost Table ILLUSTRATION 2 TABLE 1

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>TRACTOR CAT D7 G</u> <u>2x 12.01</u>			<u>24.02</u>
<u>2 HOUR DELAY - 48000 LBS.</u>			
2. <u>LOWBOY - FOR HAULING TRACTOR</u>			<u>144.00</u>
<u>P.U.C. RATE .30/CWT</u>			
<u>48,000 LBS x .30/CWT</u>			
3. <u>LOWBOY - EMPTY MILAGE</u>			<u>55.20</u>
<u>CHARGE - P.U.C. RATE</u>			
<u>60 MILES x .92 PER MILE</u>			
4. <u>FLAG CAR - COMMERCIAL RATE</u>			<u>40.90</u>
<u>(130 Miles) (5 HRS.)</u>			
5. _____			
6. _____			
Total Machine Rate . . .	\$		<u>264.12</u>

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1. <u>TRACTOR OPERATOR</u> <u>2x 14.40</u>		<u>28.80</u>
2. _____		
3. _____		

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 28.80

C. General and Administrative Costs  
10% of Machine and Wage Rates

   \$ 252.02 X 10% . . . . . \$ 25.02

D. Total Costs . . . . . \$ 317.94

II Misc. Add'l. Costs/Adjustments

   General & Administrative Costs Not Allowed On FLAG CAR

Machine Wt D7G w/Power Shift 44300 lbs

Winch 3100 lbs w/Cable 150' of 1 1/4" = 434 lbs

III Operating Cost

Total . . . . . \$ 320

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3; - PRODUCTION COSTS  
SCHEDULE 20.

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - EQUIPMENT MOVE-IN YARDING TRACTOR FMC 210 CA

Reference for Cost Table ILLUSTRATION 2 TABLE 1

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> Machine/Time			
1.	<u>TRACTOR FMC 210 CA</u> <u>2 HR DELAY</u> <u>(27000 LBS)</u>	<u>2 x 12.93</u>		<u>25.86</u>
2.	<u>LOWBOY - FOR HAULING TRACTOR</u> <u>PULC RATE .41/CWT</u> <u>27000 LBS. x .41/CWT</u>			<u>110.70</u>
3.	<u>LOWBOY - EMPTY CHARGE</u> <u>PULC RATE .92/MI.</u> <u>60 MILES x .92/MI.</u>			<u>55.20</u>
4.				
5.				
6.				
Total Machine Rate . . .		\$	<u>191.76</u>	

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.	<u>TRACTOR OPERATOR</u>	<u>2 x 14.40</u>	<u>28.80</u>
2.			
3.			



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 28.80

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 220.56 X 10% . . . . . \$ 22.06

D. Total Costs . . . . . \$ 242.62

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 245

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20.

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - EQUIPMENT MOVE-IN (4) RUBBER TIRED

4 WHEEL SKIDDER

Reference for Cost Table ILLUSTRATION 2 TABLE 1

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>4 WHEEL SKIDDER - John DEERE</u> <u>440B 70HP W/BLADE &amp; WINCH</u> <u>3 HOUR MACHINE TIME</u>	<u>3x 4.06</u>	<u>3x 5.45</u>	<u>28.53</u>
2. <u>ON HIGHWAY TRIP PERMIT</u>			<u>8.00</u>
3.			
4.			
5.			
6.			
Total Machine Rate . . . . .	\$		<u>36.53</u>

B. <u>Wage Rates</u> (Adjusted Hourly Rate) <u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1. <u>TRACTOR OPERATOR (SMALL)</u>	<u>3x 13.82</u>	<u>41.46</u>
2.		
3.		

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 41.46

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 77.90 X 10% . . . . . \$ 7.79

D. Total Costs . . . . . \$ 85.79

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 85.00

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20.Operating Cost ComputationsActivity - RIGGING YARDING AND LOADING - WESTERN OREGONOperations - EQUIPMENT MOVE-IN (5) SMALL YARDER WASHINGTON 78ASKYLOCK YARDER W/ SWING BOOM - TRACK YARDER - CUMMINS V555 DIESEL  
197 H.P. ENGINEReference for Cost Table ILLUSTRATION 2 TABLE 1

## I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>SMALL TRACK YARDER-78A</u> <u>4 x 20.72</u> _____			<u>82.88</u>
<u>4 HOUR DELAY</u> _____			
2. <u>LOWBOY-FOR HAULING YARDER</u> _____			<u>247.80</u>
<u>PUC RATE -.28/CWT</u> _____			
<u>88,500 lbs x .28/CWT</u> _____			
3. <u>LOWBOY EMPTY MILEAGE</u> _____			<u>55.20</u>
<u>CHARGE PUC RATE</u> _____			
<u>60 Miles</u> _____			
4. <u>FLAG CAR - COMMERCIAL</u> _____			<u>40.90</u>
<u>RATE 130 MILES 5 HRS</u> _____			
5. _____			
6. _____			
Total Machine Rate . . . . \$			<u>426.78</u>
B. <u>Wage Rates</u> (Adjusted Hourly Rate)			
<u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>	
1. <u>YARDING ENGINEER</u> <u>4 x 14.23</u> _____			<u>56.92</u>
2. _____			
3. _____			



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 56.92

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 442.80 X 10% . . . . . \$ 44.28

D. Total Costs . . . . . \$ 527.98

II Misc. Add'l. Costs/Adjustments

\$ G&A Cost Not Allowed On Allowance For Flag Car  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 530

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - RIGGING YARDING AND LOADING - WESTERN OREGONOperations - EQUIPMENT MOVE-IN (6) 90' PORTABLE TOWER YARDERReference for Cost Table ILLUSTRATION 2 TABLE 1

## I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> Machine/Time			
1.	<u>TOWER-YARDER 90' TOWER</u> <u>4 HR DELAY</u>	<u>4x19.32</u>		<u>77.28</u>
2.	<u>LOGGING TRUCK &amp; TRAILER</u> <u>FOR HAULING - 2 HR DELAY</u> <u>&amp; MACHINE TIME</u>			<u>44.86</u>
3.	<u>2 FLAG CARS - COMMERCIAL RATE</u> <u>\$ .18/MILE x 70 MILES = 12.60</u> <u>3.50/HR x 4 HRS = 14.00</u>			<u>53.20</u>
4.				
5.				
6.				
Total Machine Rate . . . .		\$	<u>175.34</u>	

B.	<u>Wage Rates</u> (Adjusted Hourly Rate) Crew Position/Time	<u>Hour Rate</u>	<u>Total</u>
1.	<u>YARDING ENGINEER</u>	<u>4x14.23</u>	<u>56.92</u>
2.	<u>LOG TRUCK DRIVER</u>	<u>4x11.82</u>	<u>47.28</u>
3.			

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 104.20

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 226.34 X 10% . . . . . \$ 22.63

D. Total Costs . . . . . \$ 302.17

II Misc. Add'l. Costs/Adjustments

"G & A COST NOT ALLOWED ON COST OF FLAG CAR"  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 305

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - RIGGING YARDING AND LOADING - WESTERN OREGONOperations - EQUIPMENT MOVE-IN (7) 110' PORTABLE TOWER YARDERReference for Cost Table ILLUSTRATION 2 TABLE 1

## I Determining Hourly Cost

A. Machine Rates  
Machine/TimeFixed      Operating      Total1. TOWER/YARDER - 110' TOWER      4x37.46      \_\_\_\_\_      147.84  
4 HR DELAY2. LOGGING TRUCK & TRAILER FOR      4x6.59      2x9.32      45.00  
HAULING TOWER  
2 HR DELAY & MACHINE RATE3. LOWBOY FOR HAULING YARDER      \_\_\_\_\_      \_\_\_\_\_      201.60  
PUC RATE .28/CWT 3PM Haul  
12000LBS x .28/CWT4. LOWBOY - EMPTY MILEAGE CHARGE      \_\_\_\_\_      \_\_\_\_\_      55.20  
PUC RATE .92/MILE  
60 MILES @ .92/MILE5. FLAG CAR COMMERCIAL RATE      \_\_\_\_\_      \_\_\_\_\_      106.40  
4 CARS @ \$26.60/CAR6. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Total Machine Rate . . . . \$ 558.04B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/TimeHour Rate      Total1. YARDING ENGINEER      4x14.23      56.922. LOG TRUCK DRIVER      4x11.82      47.28

3. \_\_\_\_\_



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 104.20

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 555.84 x 10% . . . . . \$ 55.58

D. Total Costs . . . . . \$ 717.82

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 720

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20.Operating Cost ComputationsActivity - RIGGING YARDING AND LOADING - WESTERN OREGONOperations - EQUIPMENT MOVE-IN (8) PORTABLE 110' TOWERSTATIC SKYLINE- TOWER YARDER SIDEReference for Cost Table ILLUSTRATION 2 TABLE I

## I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> Machine/Time			
1. <u>110' TOWER-YARDER-SKY CAR</u> <u>9x71.21</u>			<u>640.89</u>
<u>SINGLE DRUM 250000 LBS</u>			
<u>9 HR DELAY</u>			
2. <u>LOWBOY FOR HAULING SKYLINE</u>			<u>1325.00</u>
<u>PULC RATE .53/CWT</u>			
<u>250 000 lbs x .53/CWT</u>			
3. <u>LOWBOY-EMPTY MILEAGE CHARGE</u>			<u>220.80</u>
<u>PULC RATE 4 CARRIERS</u>			
<u>240 MILES @ .92/MI</u>			
4. <u>FLAG CARS-COMMERCIAL RATE</u>			<u>365.00</u>
<u>125 MILES</u>			
5. _____			
6. _____			
Total Machine Rate . . . \$			<u>2551.69</u>

B. <u>Wage Rates</u> (Adjusted Hourly Rate)		
Crew Position/Time	<u>Hour Rate</u>	<u>Total</u>
1. <u>YARDING ENGINEER</u>	<u>8x14.23</u>	<u>113.84</u>
2. <u>LOADING ENGINEER</u>	<u>8x13.76</u>	<u>110.08</u>
3. <u>TRACTOR OPERATOR (LARGE)</u>	<u>8x14.40</u>	<u>115.20</u>

SCHEDULE 20

4.	<u>CHASER</u>	<u>6x12.55</u>	<u>75.30</u>
5.	_____	_____	_____
6.	_____	_____	_____
7.	_____	_____	_____
8.	_____	_____	_____

Total Wage Rate . . . . . \$ 414.42

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 260.11 X 10% . . . . . \$ 260.11

D. Total Costs . . . . . \$ 3226.22

II Misc. Add'l. Costs/Adjustments

11 G & A Cost Not Allowed On Cost Of Flag Car

Move-In Allowance For Associated Equipment

Yarding Tractor - D7F \$ 316/70 Miles = \$ 4.15/Mile

Mobile Loader - Banco 450 (Track) \$ 564/70 " = \$ 8.05/Mile

Basic Road Construction Unit \$ 1050/70 " = \$ 15.00/Mile

III Operating Costs

Total . . . . . \$ 3225

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 .. PRODUCTION COSTS  
SCHEDULE 20.Operating Cost ComputationsActivity - RIGGING YARDING AND LOADING - WESTERN OREGONOperations - EQUIPMENT MOVE-IN (9) MOBILE YARDER-LOADERReference for Cost Table ILLUSTRATION 2 TABLE 1

## I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> <u>Machine/Time</u>			
1.	<u>YARDER-LOADER SJ-5R</u> <u>USED EQUIPMENT</u> <u>4 HRS. MACHINE TIME</u>	<u>4x11.90</u>	<u>4x10.20</u>	<u>88.40</u>
2.	<u>FLAG CAR COMMERCIAL RATE</u> <u>130 MILES @ .18/MI.</u> <u>+ 6 HRS. @ 3.50/HR.</u>			<u>44.40</u>
3.				
4.				
5.				
6.				
Total Machine Rate . . . .		\$		<u>132.80</u>

B.	<u>Wage Rates (Adjusted Hourly Rate)</u> <u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1.	<u>YARDING ENGINEER</u>	<u>4x 14.23</u>	<u>56.92</u>
2.			
3.			



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 56.92

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ <sup>11</sup> 145.32 x 10% . . . . . \$ 14.53

D. Total Costs . . . . . \$ \_\_\_\_\_

II Misc. Add'l. Costs/Adjustments

<sup>11</sup> G&A. COSTS NOT ALLOWED ON COST OF FLAG CAR  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 205

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - RIGGING YARDING AND LOADING - WESTERN OREGONOperations - EQUIPMENT MOVE-IN (10) LIGHT MOBILE LOG LOADERReference for Cost Table ILLUSTRATION 2 TABLE 1I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>LOADER BARKO MODEL 160</u> <u>2x 4.21</u>			<u>8.42</u>
<u>MOUNTED ON USED LOGGING TRUCK</u>			
<u>DELAY 2 HRS.</u>			
2. <u>LOADER CARRIER OPERATING</u>		<u>2x 9.32</u>	<u>18.64</u>
<u>AS LOG TRUCK FOR HAULING</u>			
<u>2 HRS. OPERATING</u>			
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
Total Machine Rate . . . \$ <u>27.06</u>			
B. <u>Wage Rates</u> (Adjusted Hourly Rate) <u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>	
1. <u>LOG TRUCK OPERATOR</u> <u>2x 11.82</u>		<u>23.64</u>	
2. _____	_____	_____	
3. _____	_____	_____	

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 23.65

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 50.70 X 10% . . . . . \$ 5.07

D. Total Costs . . . . . \$ 55.77

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 55

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - RIGGING YARDING AND LOADING - WESTERN OREGONOperations - EQUIPMENT MOVE-IN (H) HEAVY MOBILE LOG LOADER (TRACKED)Reference for Cost Table ILLUSTRATION 2 TABLE 1

## I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>BARKO 450 TRACK LOADER</u> <u>4x8.59</u> <u>4x6.16</u> <u>59.00</u> <u>60" GRAPPLE - SELF-CONTAINED</u> <u>CARRIER 4 HR. MACHINE TIME</u>			
2. <u>LOWBOY - FOR HAULING LOADER</u> <u>212.80</u> <u>PULC RATE .28/CWT</u> <u>76000 LBS. x .28/CWT</u>			
3. <u>LOWBOY - EMPTY MILEAGE</u> <u>55.20</u> <u>CHARGE 60 MILES x 0.92 MI</u>			
4. <u>FLAG CAR - COMMERCIAL RATE</u> <u>88.80</u> <u>2 CARS - 130 MILES</u> <u>.18/MI. + 3.50/HR. - 6 HRS</u>			
5. _____			
6. _____			
Total Machine Rate . . .	\$	<u>415.80</u>	
B. <u>Wage Rates</u> (Adjusted Hourly Rate) <u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>	
1. <u>LOADING ENGINEER</u> <u>4x13.76</u> <u>55.04</u>			
2. <u>CHASER</u> <u>4x12.55</u> <u>50.20</u>			
3. _____			



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 105.24

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 432.14 X 10% . . . . . \$ 43.21

D. Total Costs . . . . . \$ 564.25

II Misc. Add'l. Costs/Adjustments

\$ G&A COST NOT ALLOWED ON COST OF FLAG CAR

III Operating Cost

Total . . . . . \$ 565

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9535.3 - PRODUCTION COSTS  
SCHEDULE 20.

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - EQUIPMENT MOVE-IN (12) HEAVY MOBILE LOG LOADER  
(RUBBER TIRED)

Reference for Cost Table ILLUSTRATION 2 TABLE 1

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>BARKO 450 RUBBER-TIRED 6" GRAPPLE</u> <u>6x9.37</u>		<u>6x6.66</u>	<u>96.18</u>
<u>SELF CONTAINED CARRIER</u>			
<u>6 HR. MACHINE TIME</u>			
2. <u>FLAG CAR COMMERCIAL RATE</u>			<u>102.80</u>
<u>2 TRIPS 130 MILES @ .18/MI.</u>			
<u>* 3.60/HR. - 16 HRS. 2 CARS</u>			
3. <u>ON HIGHWAY TRIP PERMIT</u>			<u>8.00</u>
<u>@ 8.00 HIGHWAY PERMIT FOR</u>			
<u>OVER 8000 LBS. GROSS @ 3.00</u>			
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
Total Machine Rate . . . \$ <u>206.98</u>			

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1. <u>LOADING ENGINEER</u>	<u>6x13.76</u>	<u>82.56</u>
2. <u>CHASER</u>	<u>6x12.55</u>	<u>75.30</u>
3. _____	_____	_____

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 157.86

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 262.04 X 10% . . . . . \$ 26.20

D. Total Costs . . . . . \$ 391.04

II Misc. Add'l. Costs/Adjustments

11 G&A COSTS NOT ALLOWED ON COST ON FLAG CAR  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 390

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - EQUIPMENT MOVE-IN (13) RUBBER TIRED FRONT END LOADER

Reference for Cost Table ILLUSTRATION 2 TABLE 1

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> <u>Machine/Time</u>			
1.	<u>FRONT END LOADER CAT 966C</u> <u>3 HRS. MACHINE TIME</u>	<u>3x5.54</u>	<u>3x7.90</u>	<u>40.32</u>
2.	<u>ON HIGHWAY TRIP PERMIT DMV</u>			<u>8.00</u>
3.				
4.				
5.				
6.				
Total Machine Rate . . . .		\$		<u>48.32</u>

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.	<u>TRACTOR OPERATOR</u>	<u>3x13.82</u>	<u>41.46</u>
2.			
3.			



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 41.46

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 89.78 X 10% . . . . . \$ 8.98

D. Total Costs . . . . . \$ 98.78

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 100

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - RIGGING YARDING AND LOADING - EASTERN OREGONOperations - EQUIPMENT MOVE-IN (1) YARDING TRACTORReference for Cost Table ILLUSTRATION 2 TABLE 2

## I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> Machine/Time			
1.	<u>TRACTOR - CATERPILLAR N7G</u> <u>2 HR. DELAY 48000 LBS.</u>	<u>2x12.01</u>		<u>24.02</u>
2.	<u>LOWBOY - FOR HAULING TRACTOR</u> <u>PUC RATE .30/CWT</u> <u>48000 LBS x .30/CWT</u>			<u>144.00</u>
3.	<u>LOWBOY EMPTY MILEAGE CHARGE</u> <u>PUC RATE 60 MILES @ .92/MILE</u>			<u>55.20</u>
4.	<u>FLAG CAR COMMERCIAL RATE</u> <u>130 MILES</u>			<u>40.90</u>
5.				
6.				
Total Machine Rate . . .		\$	<u>264.12</u>	

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.			
2.	<u>TRACTOR OPERATOR</u>	<u>2x13.43</u>	<u>26.86</u>
3.			

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 26.86

C. General and Administrative Costs  
10% of Machine and Wage Rates

11  
\$ 250.08 X 10% . . . . . \$ 25.00

D. Total Costs . . . . . \$ 315.98

II Misc. Add'l. Costs/Adjustments

"G&A Cost Not Allowed On Cost Of Flag Car"  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 315

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - RIGGING YARDING AND LOADING - EASTERN OREGONOperations - EQUIPMENT MOVE-IN (2) HEAVY MOBILE LOG LOADER(TRACKED)Reference for Cost Table ILLUSTRATION 2 TABLE 2I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> <u>Machine/Time</u>			
1.	<u>BARKO 450 TRACKED LOADER 60"</u> <u>GRAPPLE SELF CONTAINED CARRIER</u> <u>4 HR. MACHINE TIME</u>	<u>4x8.59</u>	<u>4x6.16</u>	<u>59.00</u>
2.	<u>LOWBOY - FOR HAULING LOADER</u> <u>PUC RATE .28/CWT</u> <u>76000 LBS. x .28/CWT</u>			<u>212.80</u>
3.	<u>FLAG CAR COMMERCIAL RATE</u> <u>2 CARS 130 MILES .18/M</u> <u>+ 6 HRS @ 3.50/HR</u>			<u>89.80</u>
4.	<u>LOWBOY EMPTY HAULING CHARGE</u> <u>60 MILES @ .92/M/11</u>			<u>55.20</u>
5.				
6.				
Total Machine Rate . . .		\$	<u>416.80</u>	

B.	<u>Wage Rates</u> (Adjusted Hourly Rate)			
	<u>Crew Position/Time</u>	<u>Hour Rate</u>		<u>Total</u>
1.	<u>LOADING ENGINEER</u>	<u>4x14.34</u>		<u>57.36</u>
2.	<u>CHASER</u>	<u>4x11.65</u>		<u>46.60</u>
3.				



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 103.96

C. General and Administrative Costs  
10% of Machine and Wage Rates

✓  
\$ 431.96 X 10% . . . . . \$ 43.20

D. Total Costs . . . . . \$ 563.96

II Misc. Add'l. Costs/Adjustments

✓ G & A COSTS NOT ALLOWED ON COST OF FLAG CAR  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 565

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - RIGGING YARDING AND LOADING - EASTERN OREGONOperations - EQUIPMENT MOVE-IN (3) MOBILE YARDER-LOADERReference for Cost Table ILLUSTRATION 2 TABLE 2

## I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> Machine/Time			
1. <u>YARDER-LOADER SJ-5R</u> <u>4x11.90</u> <u>4x10.20</u> <u>88.40</u> <u>USED EQUIPMENT</u> <u>4 HR MACHINE TIME</u>			
2. <u>FLAG CAR - COMMERCIAL RATE</u> <u>44.40</u> <u>130 MILES @ 18/MI.</u> <u>+ 6 HRS @ 3.50 HR</u>			
3. _____ _____ _____			
4. _____ _____ _____			
5. _____ _____ _____			
6. _____ _____ _____			
Total Machine Rate . . . . .	\$	<u>132.80</u>	

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1. <u>LOADER OPERATOR</u> <u>4x14.34</u> <u>57.36</u>		
2. _____ _____		
3. _____ _____		

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 57.36

C. General and Administrative Costs  
10% of Machine and Wage Rates

4  
\$ 145.76 X 10% . . . . . \$ 14.58

D. Total Costs . . . . . \$ 205.74

II Misc. Add'l. Costs/Adjustments

G & A COSTS NOT ALLOWED ON COST OF FLAG CAR  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 205

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - TRACTOR LOGGING-YARDING-CAT D7G

Reference for Cost Table ILLUSTRATION 2 TABLE 3, 4, 6 & 7.

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>2 YARDING TRACTORS CAT D7G</u>	<u>2x12.01</u>	<u>2x13.82</u>	<u>51.66</u>
<u>MACHINE OPERATING RATE</u>			
2. <u>CHAINSAW</u>	<u>.40</u>	<u>3/8x.93</u>	<u>.75</u>
<u>FIXED COST/HR. PLUS</u>			
<u>3 HRS. PER DAY OPERATING</u>			
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
Total Machine Rate . . . \$			<u>52.41</u>

B. <u>Wage Rates</u> (Adjusted Hourly Rate)		
<u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1. <u>2 Tractor Operators</u>	<u>2x14.40</u>	<u>28.80</u>
2. <u>2-Choker Settlers</u>	<u>2x12.23</u>	<u>24.46</u>
3. <u>1-Choker</u>	<u>12.55</u>	<u>12.55</u>



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 65.81

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 118.22 X 10% . . . . . \$ 11.82

D. Total Costs . . . . . \$ 130.04

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 130.04

Per Minute \$ 2.167 TWO TRACTORS/MIN.  
# 1.084 ONE "

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - RIGGING YARDING AND LOADING - WESTERN OREGONOperations - TRACTOR LOGGING-YARDING- FMC 210 CA."LOW GROUND PRESSURE TRACTOR"Reference for Cost Table ILLUSTRATION 2 TABLE 9,10,12,14 & 15

## I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>2 YARDING TRACTORS FMC 210A</u> <u>2x1293</u> <u>2x16.90</u> <u>59.66</u> <u>MACHINE OPERATING RATE</u>			
2. <u>CHAINSAW</u> <u>0.40</u> <u>3/8x.93</u> <u>0.75</u> <u>FIXED COST/HR PLUS</u> <u>3 HRS. PER DAY OPERATION</u>			
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
Total Machine Rate . . . . \$ <u>60.41</u>			

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1. <u>2-TRACTOR OPERATORS</u> <u>2x14.40</u> <u>28.80</u>		
2. <u>2-CHOKER SETTERS</u> <u>2x12.23</u> <u>24.46</u>		
3. <u>1-CHASER</u> <u>12.55</u> <u>12.55</u>		

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 65.81

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 126.22 X 10% . . . . . \$ 12.62

D. Total Costs . . . . . \$ 138.04

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 138.04  
Per Minute \$ 2.30 Two Tractors / MIN  
1.15 ONE " "

Remarks:

9353.3: - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - RIGGING YARDING AND LOADING - WESTERN OREGONOperations - TRACTOR LOGGING - LOADING - W/ TRACK LOADERReference for Cost Table ILLUSTRATION 2 TABLE 3,5,6,8,9,11,12,13,16,17

## I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> Machine/Time			
* 1.	<u>HEAVY MOBILE LOADER BARKO 8.54</u> <u>450 TRACK LOADER FIXED COST/Hr.</u> <u>PLUS HOURLY OPERATING RATE</u> <u>AT 75 %</u>	<u>.75</u>	<u>x 6.16</u>	<u>13.21</u>
2.				
3.				
4.				
5.				
6.				
Total Machine Rate . . .		\$		<u>13.21</u>

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.	<u>LOADING ENGINEER</u>	<u>13.76</u>	<u>13.76</u>
2.			
3.			



9353.3 - PRODUCTION COSTS

SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 26.97

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 26.97 X 10% . . . . . \$ 2.70

D. Total Costs . . . . . \$ 29.67

II Misc. Add'l. Costs/Adjustments

\* Reduction of 25% reflects waiting time for yarding tractors  
and MACHINE DOWN TIME  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Costs

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 29.67

Per Minute \$ 0.494

0.247 Half Loading Cost

For Tractor Yarding

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - TRACTOR LOGGING SALVAGE PICKUP - YARDING

Reference for Cost Table ILLUSTRATION 2 TABLE 7A '78

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>YARDING TRACTOR CAT D7G</u> <u>12.01</u> <u>13.82</u> <u>25.83</u> <u>MACHINE RATE</u>			
2. <u>CHAINSAW</u> <u>.40</u> <u>3/8x.93</u> <u>0.75</u> <u>FIXED COST/HR PLUS</u> <u>3 HOUR PER DAY OPERATION</u>			
3. _____			
4. _____			
5. _____			
6. _____			
Total Machine Rate . . . . .	\$		<u>26.58</u>

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1. <u>TRACTOR OPERATOR</u> <u>14.40</u> <u>14.40</u>		
2. <u>CHOKER SETTER</u> <u>12.23</u> <u>12.23</u>		
3. _____		

9353.3 - PRODUCTION COSTS

SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 26.63

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 53.21 X 10% . . . . . \$ 5.32

D. Total Costs . . . . . \$ 58.53

II Misc. Add'l. Costs/Adjustments

TABULAR ADJUSTMENT

Salvage pickup yarding cost (one tractor) per minute

Tractor logging yarding cost (one tractor) per minute

ADJUSTMENT:

$0.976 \div 1.084 = .900$  Factor for salvage pickup

III Operating Costs

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 58.53

Per Minute \$ 0.976

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

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Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - TRACTOR LOGGING SALVAGE PICKUP-LOADING

Reference for Cost Table ILLUSTRATION 2 TABLE 8A & 8B

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> <u>Machine/Time</u>			
* 1.	<u>FRONT END LOG LOADER CAT 966C</u> <u>FIXED COST/HOUR PLUS HOURLY</u> <u>OPERATING RATE OF 75%</u>	<u>5.54</u>	<u>75x7.90</u>	<u>11.47</u>
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
Total Machine Rate . . .		\$	<u>11.47</u>	

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.	<u>Front End Loader Operator</u> <u>(Tractor Operator Large)</u>	<u>14.40</u>	<u>14.40</u>
2.	_____	_____	_____
3.	_____	_____	_____



9353.3 - PRODUCTION COSTS

SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 14.40

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 25.87 X 10% . . . . . \$ 2.59

D. Total Costs . . . . . \$ 28.46

II Misc. Add'l. Costs/Adjustments

\* Reduction of 25% reflects waiting time for yarding tractor  
and machine down time.

TABULAR ADJUSTMENT

Salvage pickup loading cost = \$0.474

Tractor logging loading cost = \$0.494

ADJUSTMENT:

\$0.474 -- \$0.494 = factor or salvage  
pickup

III Operating Costs

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 28.46

Per Minute \$ 0.474

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - RIGGING YARDING AND LOADING - WESTERN OREGONOperations - TRACTOR LOGGING-RIGGING COST- CLEARCUT  
AND PARTIAL CUT ( 1ST LANDING)Reference for Cost Table ILLUSTRATION 2 TABLE 18 (1st LANDING)

## I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>2 YARDING TRACTORS CAT D7G</u> <u>5x12.01</u>			<u>60.05</u>
<u>2 1/2 HRS. FIXED COST</u>			
2. <u>CHAINSAW</u> <u>4x40</u>			<u>1.60</u>
<u>4 HRS. FIXED COST</u>			
3. <u>MOBILE LOADER BARKO 450</u> <u>8.59</u> <u>6.16</u>			<u>14.75</u>
<u>TRACKED-HR MACHINE COST</u>			
4. <u>YARDING TRACTOR- CAT D7G</u> <u>12.01</u> <u>13.82</u>			<u>25.83</u>
<u>1 HR. MACHINE COST FOR</u> <u>LANDIN CONSTRUCTION</u>			
5. _____	_____	_____	_____
6. _____	_____	_____	_____

Total Machine Rate . . . \$ 102.23

B. <u>Wage Rates</u> (Adjusted Hourly Rate)		
<u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1. <u>2 TRACTOR OPERATORS (3 HRS)</u>	<u>6x14.40</u>	<u>86.40</u>
2. <u>2 CHOKER SETTERS (4 HRS)</u>	<u>8x12.23</u>	<u>97.84</u>
3. <u>CHASER (1 HR)</u>	<u>12.55</u>	<u>12.55</u>

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4.	<u>LOADING ENGINEER</u>	<u>(1 HR)</u>	<u>13.76</u>	<u>13.76</u>
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
7.	_____	_____	_____	_____
8.	_____	_____	_____	_____

Total Wage Rate . . . . . \$ 210.55

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 312.78 X 10% . . . . . \$ 31.28

D. Total Costs . . . . . \$ 344.06

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 345

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

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Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - TRACTOR LOGGING-RIGGING COST- CLEARCUT  $\frac{1}{2}$   
PARTIAL CUT (ADDITIONAL LANDINGS)

Reference for Cost Table ILLUSTRATION 2 TABLE 10

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> Machine/Time			
1.	<u>2 YARDING TRACTORS CAT D7G</u> <u>1/2 HR. FIXED COST</u> <u>1/2 HR. MACHINE COST</u>	<u>12.01</u>	<u>13.82</u>	<u>25.83</u>
2.	<u>CHAINSAW</u> <u>1/2 HR. FIXED COST</u>	<u>1/2 x 40</u>		<u>.20</u>
3.	<u>MOBILE LOADER-BARKO 450</u> <u>(TRACKED)- 1/2 HR. FIXED COST</u> <u>1/2 HR. OPERATING COST</u>	<u>1/2 x 8.59</u>	<u>1/2 x 6.16</u>	<u>7.37</u>
4.	<u>YARDING TRACTOR-CAT D7G</u> <u>1 HR. MACHINE COST FOR</u> <u>LANDING CONSTRUCTION</u>	<u>12.01</u>	<u>13.82</u>	<u>25.83</u>
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
Total Machine Rate . . .		\$	<u>59.23</u>	

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1. <u>2-TRACTOR OPERATORS (1/2 HR)</u>	<u>14.40</u>	<u>14.40</u>
2. <u>2-CHOKER SETTERS (1/2 HR)</u>	<u>12.23</u>	<u>12.23</u>
3. <u>CHASER (1/2 HR)</u>	<u>.5 x 12.55</u>	<u>6.28</u>



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4.	<u>LOADING ENGINEER</u>	<u>(1/2 HOUR)</u>	<u>.5 x 13.76</u>	<u>6.88</u>
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
7.	_____	_____	_____	_____
8.	_____	_____	_____	_____

Total Wage Rate . . . . . \$ 39.79

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 99.02 x 10% . . . . . \$ 9.90

D. Total Costs . . . . . \$ 108.92

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 110

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

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Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - TRACTOR LOGGING RIGGING COST - SALVAGE PICKUP

1<sup>ST</sup> LANDING

Reference for Cost Table ILLUSTRATION 2 TABLE 18

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>YARDING TRACTOR CAT D7G</u> <u>2 1/2 x 12.01</u> <u>30.02</u> <u>2 1/2 HRS FIXED COST</u>			
2. <u>CHAINSAW</u> <u>4 x .40</u> <u>1.60</u> <u>4 HRS FIXED COST</u>			
3. <u>FRONT END LOG LOADER 966C</u> <u>5.54</u> <u>7.90</u> <u>13.44</u> <u>1 HR MACHINE RATE</u>			
4. <u>YARDING TRACTOR CAT D7G</u> <u>12.01</u> <u>13.82</u> <u>25.83</u> <u>1 HR MACHINE RATE FOR</u> <u>LANDING CONSTRUCTION</u>			
5. _____	_____	_____	_____
6. _____	_____	_____	_____
Total Machine Rate . . . \$			<u>70.89</u>

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1. <u>TRACTOR OPERATOR (6 HRS)</u> <u>6 x 14.40</u> <u>86.40</u>		
2. <u>CHOKER SETTER (6 HRS)</u> <u>6 x 12.23</u> <u>73.38</u>		
3. <u>FRONT END LOADER OPER (3 HRS)</u> <u>3 x 14.40</u> <u>43.20</u> <u>(TRACTOR OPER. LARGE)</u>		

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 202.98

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 273.87 X 10% . . . . . \$ 27.39

D. Total Costs . . . . . \$ 301.26

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 300

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Appendix 1, Page 125  
(C2b8)

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING--WESTERN OREGON

Operations - TRACTOR LOGGING--RIGGING COST--SALVAGE PICKUP

(ADDITIONAL LANDING)

Reference for Cost Table ILLUSTRATION 2 TABLE 18

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>Yarding Tractor D7G</u>	<u>2 x 12.01</u>	<u>2 x 13.82</u>	<u>51.64</u>
2 Hrs. Fixed Cost			
2 Hrs. Operating Cost			
2. <u>Chainsaw</u>	<u>1 1/2 x 40</u>		<u>20</u>
1/2 Hr. Fixed Cost			
3. <u>Front End Log Loader Cat 966C</u>	<u>1 1/2 x 5.54</u>	<u>1 1/2 x 7.90</u>	<u>6.72</u>
1/2 Hr. Machine Cost			
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
Total Machine Rate . . .	\$		<u>58.58</u>

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1. <u>Tractor Operator</u> (1 Hr.)	<u>14.40</u>	<u>14.40</u>
2. <u>Choker Setter</u> (1 HR.)	<u>12.23</u>	<u>12.23</u>
3. <u>Front End Loader</u> (1Hr.)	<u>14.40</u>	<u>14.40</u>
Operator (Tractor oper. large)		



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 41.03

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 99.61 X 10% . . . . . \$ 9.96

D. Total Costs . . . . . \$ 109.57

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 110

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 -- PRODUCTION COSTS  
SCHEDULE 20

Appendix 1, Page 127  
(C2b9)

Operating Cost Computations

Activity - RIGGING YARDING & LOADING---EASTERN OREGON

Operations - TRACTOR LOGGING--YARDING--D7G

Reference for Cost Table ILLUSTRATION 2 TABLE 20

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> <u>Machine/Time</u>			
1.	<u>2 Yarding Tractors D7G</u> <u>Machine Rate</u>	<u>2 x 12.01</u>		<u>51.66</u>
2.	<u>Chainsaw</u> <u>Fixed Cost Per Hour Plus Operating</u> <u>Based On 3 Hrs. Per Day</u>	<u>.40</u>	<u>1/3 x .93</u>	<u>.71</u>
3.				
4.				
5.				
6.				
Total Machine Rate . . .		\$		<u>53.08</u>
B.	<u>Wage Rates (Adjusted Hourly Rate)</u> <u>Crew Position/Time</u>	<u>Hour Rate</u>		<u>Total</u>
1.	<u>2 Tractor Operators</u>	<u>2 x 13.43</u>		<u>26.86</u>
2.	<u>2 Choker Setters</u>	<u>2 x 11.72</u>		<u>23.44</u>
3.	<u>Chaser</u>	<u>11.65</u>		<u>11.65</u>

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 61.95

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 115.03 X 10% . . . . . \$ 11.50

D. Total Costs . . . . . \$ 126.53

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 126.53  
Per Minute \$ 2.109 2 TRACTORS  
1,054 1 TRACTOR

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - EASTERN OREGON

Operations - TRACTOR LOGGING-YARDING-FMC 210 CA

"LOW GROUND PRESSURE TRACTOR"

Reference for Cost Table ILLUSTRATION 2 TABLE 22 & 23

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> Machine/Time			
1. <u>2 YARDING TRACTORS FMC 210A</u> <u>2x12.93</u> <u>2x16.90</u> <u>59.66</u> <u>MACHINE OPERATING RATE</u>			
2. <u>CHAIN SAW</u> <u>0.40</u> <u>3/4x.93</u> <u>0.75</u> <u>FIXED COST/HR PLUS</u> <u>3HRS PER DAY OPERATION</u>			
3. _____			
4. _____			
5. _____			
6. _____			
Total Machine Rate . . . . \$ <u>60.41</u>			

B. <u>Wage Rates</u> (Adjusted Hourly Rate) Crew Position/Time	<u>Hour Rate</u>	<u>Total</u>
1. <u>2 TRACTOR OPERATORS</u> <u>2x13.43</u> <u>26.86</u>		
2. <u>2 CHOKER SETTERS</u> <u>2x11.72</u> <u>23.44</u>		
3. <u>CHASER</u> <u>11.65</u> <u>11.65</u>		



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 61.95

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 122.36 X 10% . . . . . \$ 12.24

D. Total Costs . . . . . \$ 134.60

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 134.60

Per Minute \$ 2.24 TWO TRACTORS  
1.12 ONE "

Remarks:

9353.3 -- PRODUCTION COSTS  
SCHEDULE 20

Appendix 1, Page 131  
(C2b10)

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING--EASTERN OREGON

Operations - TRACTOR LOGGING---LOADING

Reference for Cost Table ILLUSTRATION 2 TABLE 21 & 24

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>Heavy Mobile Hydraulic Log Loader</u> <u>Barko 450 Trackloader</u> <u>Machine Rate Per Hour</u>	<u>8.59</u>	<u>6.16</u>	<u>\$ 14.75</u>
2. _____ _____ _____	_____	_____	_____
3. _____ _____ _____	_____	_____	_____
4. _____ _____ _____	_____	_____	_____
5. _____ _____ _____	_____	_____	_____
6. _____ _____ _____	_____	_____	_____
Total Machine Rate . . .	\$	<u>14.75</u>	

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1. <u>Loader Operator</u>	<u>\$14.34</u>	<u>\$14.34</u>
2. _____	_____	_____
3. _____	_____	_____

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 14.34

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 29.09 X 10% . . . . . \$ 2.91

D. Total Costs . . . . . \$ 32.00

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 32.00

Per Minute \$ .533

Remarks:

267 HALF LOADING COST  
FOR TRACTOR YARDING

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

(C2b11)

Operating Cost ComputationsActivity - RIGGING YARDING & LOADING--EASTERN OREGONOperations - Tractor Logging--Rigging Cost (1st Landing)Reference for Cost Table Illustration 2 Table 25I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>2 Yarding Tractors Cat D7G</u> <u>2 3/4 Hours Fixed Cost</u>	<u>55x12.01</u>		<u>\$ 66.05</u>
2. <u>Chainsaw</u> <u>4 Hrs. Fixed Cost</u>	<u>4x.40</u>		<u>1.60</u>
3. <u>Loader Barko 450</u> <u>Track Loader</u> <u>1 Hr. Machine Costs</u>	<u>8.59</u>	<u>6.16</u>	<u>14.75</u>
4. <u>Yarding Tractor D7G</u> <u>1/2 Hr. Machine Rate</u> <u>For Landing Construction</u>	<u>0.5x12.01</u>	<u>.5x13.82</u>	<u>12.91</u>
5. _____ _____ _____	_____	_____	_____
6. _____ _____ _____	_____	_____	_____
Total Machine Rate . . .	\$		<u>95.31</u>

B. Wage Rates (Adjusted Hourly Rate)

<u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1. <u>2 Tractor Operators (3 Hrs)</u>	<u>6x13.43</u>	<u>80.58</u>
2. <u>2 Choker Setters (4 Hrs.)</u>	<u>8x 11.72</u>	<u>93.76</u>
3. <u>Chaser (1 Hr)</u>	<u>11.65</u>	<u>11.65</u>



## SCHEDULE 20

4.	<u>Loader Operator</u>	<u>14.34</u>	<u>14.34</u>
5.	_____	_____	_____
6.	_____	_____	_____
7.	_____	_____	_____
8.	_____	_____	_____

Total Wage Rate . . . . . \$ 200.33

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 295.64 X 10% . . . . . \$ 29.56

D. Total Costs . . . . . \$ 325.20

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Costs

Total . . . . . \$ 325

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - RIGGING YARDING AND LOADING - EASTERN OREGONOperations - TRACTOR LOGGING - RIGGING COST - ADDITIONAL LANDINGSReference for Cost Table ILLUSTRATION 2 TABLE 25

## I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> Machine/Time			
1.	<u>2 YARDING TRACTORS DTG</u> <u>1/2 HOUR FIXED COST</u>	<u>12.01</u>		<u>12.01</u>
2.	<u>CHAIN SAW</u> <u>1/2 HR FIXED COST</u>	<u>5x.40</u>		<u>.20</u>
3.	<u>BARKO 450 TRACK LOADER</u>	<u>5x8.59</u>	<u>5x6.16</u>	<u>7.37</u>
4.	<u>YARDING TRACTOR CAT DTG</u> <u>1/2 HR MACHINE RATE FOR</u> <u>LANDING CONSTRUCTION</u>	<u>5x12.01</u>	<u>5x12.82</u>	<u>12.91</u>
5.				
6.				
Total Machine Rate . . . .		\$	<u>32.49</u>	

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.	<u>2 TRACTOR OPERATORS (1/2 HR)</u>	<u>13.43</u>	<u>13.43</u>
2.	<u>2 CHOKER SETTERS (1/2 HR)</u>	<u>11.72</u>	<u>11.72</u>
3.	<u>CHASER (1/2 HR)</u>	<u>11.65</u>	<u>5.82</u>

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4.	<u>LOADER OPERATOR (1/2 Hr)</u>	<u>.5x1434</u>	<u>7.17</u>
5.	_____	_____	_____
6.	_____	_____	_____
7.	_____	_____	_____
8.	_____	_____	_____

Total Wage Rate . . . . . \$ 38.14

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 70.63 X 10% . . . . . \$ 7.06

D. Total Costs . . . . . \$ 77.69

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 80

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 -- PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - RIGGING YARDING AND LOADING --WESTERN OREGONOperations - HIGHLEAD LOGGING--YARDING -- SMALL YARDERWASHINGTON 78A, SKYLOCK YARDER, SWING BOOMReference for Cost Table ILLUSTRATION 2 TABLE 27I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>Washington 78A Yarder</u> <u>Machine Rate 1 Hr.</u>	<u>20.46</u>	<u>12.95</u>	<u>33.41</u>
2. <u>Chainsaw</u> <u>Fixed cost per hour plus hourly</u> <u>rate of 3 hours per day</u>	<u>0.40</u>	<u>3/8 x .93</u>	<u>.75</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
Total Machine Rate . . . \$ _____			

B. <u>Wage Rates</u> (Adjusted Hourly Rate)		
<u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1. <u>Hook Tender</u>	<u>14.59</u>	<u>14.59</u>
2. <u>Rigging Slinger</u>	<u>13.67</u>	<u>13.67</u>
3. <u>2 Choker Setters</u>	<u>2 x 12.23</u>	<u>24.46</u>



4.	Chaser	12.55	12.55
5.	Yarding Engineer	14.23	14.23
6.			
7.			
8.			

D. Total Costs . . . . .	\$ 125.03
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## Per Minute \$ 2.084

Re 1. 9-121  
6/20/77

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - HIGHLEAD LOGGING - YARDING 90' TOWER

Reference for Cost Table ILLUSTRATION 2 TABLE 31

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> Machine/Time			
1.	<u>90' PORTABLE TOWER</u> <u>BERGER YARDER</u> <u>MACHINE RATE</u>	<u>19.32</u>	<u>17.76</u>	<u>37.08</u>
2.	<u>CHAINSAW</u> <u>FIXED COST PER HOUR PLUS</u> <u>OPERATING TIME @ 3 HRS/DAY</u>	<u>0.40</u>	<u>3/8 x .93</u>	<u>0.75</u>
3.	_____	_____	_____	_____
	_____	_____	_____	_____
4.	_____	_____	_____	_____
	_____	_____	_____	_____
5.	_____	_____	_____	_____
	_____	_____	_____	_____
6.	_____	_____	_____	_____
	_____	_____	_____	_____
Total Machine Rate . . . . .		\$	<u>37.83</u>	

B.	<u>Wage Rates</u> (Adjusted Hourly Rate) Crew Position/Time	<u>Hour Rate</u>	<u>Total</u>
1.	<u>HOOKTENDER</u>	<u>14.59</u>	<u>14.59</u>
2.	<u>RIGGING SLINGER</u>	<u>13.67</u>	<u>13.67</u>
3.	<u>2 CHOKER SETTERS</u>	<u>12.23</u>	<u>24.46</u>

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4.	CHASER	12.55	12.55
5.	YARDING ENGINEER	14.23	14.23
6.			
7.			
8.			

Total Wage Rate . . . . . \$ 79.50

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 117.33 X 10% . . . . . \$ 11.73

D. Total Costs . . . . . \$ 129.06

II Misc. Add'l. Costs/Adjustments

[illegible]

### III Operating Cost

Total . . . . . \$

Per Hour \$ 129.06

Per Minute \$ 2.151

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - HIGHLEAD LOGGING - YARDING - 110' TOWER - BU 98

Reference for Cost Table ILLUSTRATION 2 TABLE 33

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>110' TOWER PORTABLE TOWER</u>	<u>37.46</u>	<u>26.83</u>	<u>64.29</u>
2. <u>CHAINSAW</u>	<u>0.40</u>	<u>3/8 x .93</u>	<u>0.75</u>
<u>3 HRS OPERATION/DAY</u>			
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____

Total Machine Rate . . . . \$ \_\_\_\_\_

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1. <u>HOOKTENDER</u>	<u>14.59</u>	<u>14.59</u>
2. <u>RIGGING SLINGER</u>	<u>13.67</u>	<u>13.67</u>
3. <u>2 CHOKER SETTERS</u>	<u>12.23</u>	<u>24.46</u>



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4.	<u>CHASER</u>	<u>12.55</u>	<u>12.55</u>
5.	<u>YARDING ENGINEER</u>	<u>14.23</u>	<u>14.23</u>
6.			
7.			
8.			

Total Wage Rate . . . . . \$ 79.50

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 144.54 X 10% . . . . . \$ 14.45

D. Total Costs . . . . . \$ 158.99

II Misc. Add'l. Costs/Adjustments


III Operating Cost

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 158.99

Per Minute \$ 2.650

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - HIGHLEAD LOGGING - LOADING

Reference for Cost Table ILLUSTRATION 2 TABLE 28, 34, 38

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> Machine/Time			
1. <u>MOBILE LOADER-BARKO 450</u>	<u>8.59</u>	<u>75x6.16</u>	<u>13.21</u>
<u>TRACK LOADER-FIXED COST 1HP</u>			
<u>OPERATING RATE @ 75% OF COST</u>			
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
Total Machine Rate . . . \$			<u>13.21</u>

B. <u>Wage Rates</u> (Adjusted Hourly Rate) Crew Position/Time	<u>Hour Rate</u>	<u>Total</u>
1. <u>LOADING ENGINEER</u>	<u>13.76</u>	<u>13.76</u>
2. _____	_____	_____
3. _____	_____	_____

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 13.76

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 26.97 x 10% . . . . . \$ 2.70

D. Total Costs . . . . . \$ 29.67

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 29.67

Per Minute \$ 0.494

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - HIGHLEAD LOGGING-RIGGING COSTS-SMALL YARDER -

WASHINGTON 78A "RIGGED FOR YARDING" 1st POLE

Reference for Cost Table ILLUSTRATION 2 TABLE 29

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> Machine/Time			
* 1.	<u>WASHINGTON 78A</u> <u>6 HRS FIXED COST</u> <u>2 HRS OPERATING COST</u>	<u>6x20.46</u>	<u>2x12.95</u>	<u>148.66</u>
2.	<u>CHAINSAW</u> <u>6 HRS FIXED COST</u>	<u>6x40</u>		<u>2.40</u>
3.	<u>MOBILE YARDER BARKD 450-TRAC</u> <u>6 HRS FIXED COST</u> <u>2 HRS OPERATING COST</u>	<u>6x8.59</u>	<u>2x6.16</u>	<u>63.86</u>
* 4.	<u>TRACTOR-DOZER-D7G</u> <u>6 HRS FIXED COST</u> <u>4 HRS OPERATING COST</u>	<u>6x12.01</u>	<u>4x13.82</u>	<u>127.34</u>
5.				
6.				
Total Machine Rate . . .		\$	<u>342.26</u>	

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.	<u>YARDING ENGINEER (6HRS)</u>	<u>6x14.23</u>	<u>85.38</u>
2.	<u>RIGGING SLINGER (6HRS)</u>	<u>6x13.67</u>	<u>82.02</u>
3.	<u>2 CHOKER SETTERS (6HRS)</u>	<u>12x12.23</u>	<u>146.76</u>



9353.3 - PRODUCTION COSTS

SCHEDULE 20

4.	CHASER	(6 hrs.)	6 x 12.55	75.30	
5.	HOOKTENDER	(6 hrs.)	6 x 14.59	87.54	
6.	LOADING ENGINEER	(6 hrs.)	6 x 13.76	82.56	
**	7.	CHASER	(6 hrs.)	6 x 12.55	75.30
**	8.	TRACTOR OPERATOR	(6 hrs.)	6 x 14.40	86.40

Total Wage Rate . . . . . \$ 721.26

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 1063.52 X 10% . . . . . \$ 106.35

D. Total Costs . . . . . \$ 1169.87

II Misc. Add'l. Costs/Adjustments

\* 3 hrs. to rig and 3 hrs. to take down for highway transportation

\*\* Landing Construction

III Operating Costs

Total . . . . . \$ 1170

Per Hour \$

Per Minute \$

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

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(C2b16)

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - HIGHLEAD LOGGING - RIGGING COSTS - SMALL YARDER

WASHINGTON 78A RIGGED FOR YARDING - ADDITIONAL POLES

Reference for Cost Table ILLUSTRATION 2 TABLE 29

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>WASHINGTON 78A</u> <u>2x20.46</u> <u>2x12.95</u> <u>66.82</u>			
<u>2 HRS. FIXED COSTS</u>			
<u>2 HRS. OPERATING COSTS</u>			
2. <u>CHAINSAW</u> <u>2x.40</u> <u></u> <u>.80</u>			
<u>2 HRS. FIXED COSTS</u>			
3. <u>MOBILE LOADER BARKO 450 (TRUCK)</u> <u>2x8.59</u> <u>6.16</u> <u>23.34</u>			
<u>2 HRS. FIXED COSTS</u>			
<u>1 HR. OPERATING</u>			
* 4. <u>TRACTOR DOZER D7G</u> <u>4x12.01</u> <u>4x13.82</u> <u>103.32</u>			
<u>4 HRS. FIXED COSTS</u>			
<u>4 HRS. OPERATING COSTS</u>			
5. <u></u> <u></u> <u></u> <u></u>			
6. <u></u> <u></u> <u></u> <u></u>			

Total Machine Rate . . . \$ 194.28

B. <u>Wage Rates</u> (Adjusted Hourly Rate)	<u>Hour Rate</u>	<u>Total</u>
<u>Crew Position/Time</u>		
1. <u>YARDING ENGINEER</u> (2 HRS) <u>14.23</u> <u>28.46</u>		
2. <u>RIGGING SLINGER</u> (2 HRS) <u>13.67</u> <u>27.34</u>		
3. <u>2 CHOKER SETTERS</u> (2 HRS) <u>12.23</u> <u>48.92</u>		

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4.	<u>CHASER</u>	<u>(2 HRS)</u>	<u>12.55</u>	<u>25.10</u>
5.	<u>HOOKTENDER</u>	<u>(2 HRS)</u>	<u>14.59</u>	<u>29.18</u>
6.	<u>LOADING ENGINEER</u>	<u>(2 HRS)</u>	<u>13.76</u>	<u>27.52</u>
* 7.	<u>CHASER</u>	<u>(4 HRS)</u>	<u>12.55</u>	<u>50.20</u>
* 8.	<u>TRACTOR OPERATOR (LARGE)</u>	<u>(4 HRS)</u>	<u>14.40</u>	<u>57.60</u>

Total Wage Rate . . . . . \$ 294.32

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 488.60 X 10% . . . . . \$ 48.86

D. Total Costs . . . . . \$ 537.46

II Misc. Add'l. Costs/Adjustments

\* LANDING CONSTRUCTION  
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\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 540

Per Hour \$ \_\_\_\_\_  
Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - HIGHLEAD - RIGGING COSTS - 90' TOWER 1st POLE

Reference for Cost Table ILLUSTRATION 2 TABLE 29

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> <u>Machine/Time</u>			
*1.	<u>90' TOWER w/BERGER YARDER</u>	<u>6x19.32</u>	<u>2x17.76</u>	<u>151.44</u>
	<u>6 HRS FIXED COSTS</u>			
	<u>2 HRS OPERATING COSTS</u>			
2.	<u>CHAINS AW</u>	<u>6x.40</u>		<u>.240</u>
	<u>6 HRS FIXED COSTS</u>			
3.	<u>BARKO 450 TRACK LOADER</u>	<u>6x8.59</u>	<u>2x6.16</u>	<u>63.86</u>
	<u>6 HRS FIXED COSTS</u>			
	<u>2 HRS OPERATING COSTS</u>			
4.	<u>TRACTOR DOZER D7G</u>	<u>6x12.01</u>	<u>4x13.82</u>	<u>127.34</u>
	<u>6 HRS FIXED COSTS</u>			
	<u>4 HRS OPERATING COSTS</u>			
5.				
6.				
Total Machine Rate . . .		\$	<u>345.04</u>	

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.	<u>YARDER ENGINEER (6HRS)</u>	<u>14.23</u>	<u>85.38</u>
2.	<u>RIGGING SLINGER (6HRS)</u>	<u>13.67</u>	<u>82.02</u>
3.	<u>2 CHOKER SETTERS (6 HRS)</u>	<u>12.23</u>	<u>146.76</u>



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4.	<u>CHASER</u>	<u>(6 Hrs)</u>	<u>12.55</u>	<u>75.30</u>
5.	<u>HOOKTENDER</u>	<u>(6 Hrs)</u>	<u>14.59</u>	<u>87.54</u>
6.	<u>LOADING ENGINEER</u>	<u>(6 Hrs)</u>	<u>13.76</u>	<u>82.56</u>
7.	<u>TRACTOR OPERATOR (LARGE)</u>	<u>(6 Hrs)</u>	<u>14.40</u>	<u>86.40</u>
8.	_____	_____	_____	_____

Total Wage Rate . . . . . \$ 645.96

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 991.00 X 10% . . . . . \$ 99.10

D. Total Costs . . . . . \$ 1090.10

II Misc. Add'l. Costs/Adjustments

\* 3 Hours to Rig and 3 hours to take down for highway  
transportation

III Operating Cost

Total . . . . . \$ 1090

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

Activity - RIGGING YARDING & LOADING - WESTERN OREGON

Operations -HIGHLEAD LOGGING - RIGGING 90' TOWER ADD'L POLE

Reference for Cost Table ILLUSTRATION 2 TABLE 29

## I Determining Hourly Cost

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

1.	Yarding Engineer	(2hrs)	$2 \times 14.23$	28.46
2.	Rigging Slinger	(2hrs)	$2 \times 13.67$	27.34
3.	2 Choker Setters	(2 hrs)	$4 \times 12.33$	48.92

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4.	CHASER	(2hrs)	2 x 12.55	25.10
5.	HOOKTENDER	(2hrs)	2 x 14.59	29.18
6.	LOADING ENGINEER	(2 hrs)	2 x 13.76	27.52
7.	TRACTOR OPERATOR (Lge)	(4hrs)	4 x 14.40	57.60
8.				
Total Wage Rate . . . . .				\$ 244.12

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 493.78 X 10% . . . . . \$ 49.38

D. Total Costs . . . . . \$ 543.16

II Misc. Add'l. Costs/Adjustments

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III Operating Costs

Total . . . . . \$ 545

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - RIGGING YARDING & LOADING - WESTERN OREGONOperations - HIGHLEAD LOGGING - RIGGING COST 110' TOWER 1st PoleReference for Cost Table ILLUSTRATION 2 TABLE 29

## I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> <u>Machine/Time</u>			
* 1.	110' Tower W/BU 98	6 x 37.46	2 x 26.83	278.42
	Yarder-6 Hours Fixed Cost			
	2 Hours Operating Costs			
2.	Chainsaw	6 x 40		240
	6 Hours Fixed Costs			
3.	Barko 450 Track Loader	6 x 8.59	2 x 6.16	63.86
	6 Hours Fixed Cost			
	2 Hours Operating Costs			
4.	Tractor Dozer D7G	6 x 12.31	4 x 13.82	127.34
	6 Hours Fixed Costs			
	4 Hours Operating Costs			
5.				
6.				
Total Machine Rate . . .		\$	472.02	

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.	Yarder Engineer (6 hrs)	6 x 14.23	85.38
2.	Rigging Slinger (6hrs)	6 x 13.67	82.02
3.	2 ChokerSetters (6hrs)	12 x 12.33	146.76



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4.	CHASER	(6hrs)	6 x 12.55	75.30
5.	HOOKTENDER	(6hrs)	6 x 14.59	87.54
6.	LOADING ENGINEER	(6hrs)	6 x 13.76	82.56
7**	TRACTOR OPERATOR (Large)	(6hrs)	6 x 14.40	86.40
8.				

Total Wage Rate . . . . . \$ 645.96

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 117.98 X 10% . . . . . \$ 11.80

D. Total Costs . . . . . \$ 1229.78

II Misc. Add'l. Costs/Adjustments

\* 3 hrs to Rig. & 3 Hrs. to take down for Highway Transportation

\*\* Landing Construction

III Operating Cost:

Total . . . . . \$ 1230

Per Hour \$

Per Minute \$

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

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(C2b18)

Operating Cost Computations

Activity - RIGGING YARDING & LOADING--WESTERN OREGON

Operations - Highlead Logging--Rigging 110' Tower Add'l Pole

Reference for Cost Table Illustration 2 Table 29

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> Machine/Time			
1.	<u>110' TOWER W/BU 98 YARDER</u> <u>2 HRS. FIXED COSTS</u> <u>2 HRS. OPERATING COSTS</u>	<u>2x37.46</u>	<u>2x26.83</u>	<u>128.58</u>
2.	<u>CHAINSAW</u> <u>2 HRS. FIXED COSTS</u>	<u>2x.40</u>		<u>0.80</u>
3.	<u>BARKO 450 TRACK LOADER</u> <u>2 HRS. FIXED COST</u> <u>1 HR. OPERATING COST</u>	<u>2x8.59</u>	<u>1x6.16</u>	<u>23.34</u>
4.	<u>TRACTOR DOZER</u> <u>4 HRS. FIXED COSTS</u> <u>4 HRS. OPERATING COSTS</u>	<u>4x12.01</u>	<u>4x13.82</u>	<u>103.22</u>
5.				
6.				
Total Machine Rate . . .		\$	<u>256.04</u>	

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.	<u>YARDING ENGINEER (2 HRS)</u>	<u>2x 14.23</u>	<u>28.46</u>
2.	<u>RIGGING SLINGER (2 HRS)</u>	<u>2x 13.67</u>	<u>27.34</u>
3.	<u>2 CHOOKER SETTERS (2 HRS)</u>	<u>4x 12.23</u>	<u>48.92</u>

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4.	<u>CHASER</u>	<u>(2Hrs.)</u>	<u>2x12.55</u>	<u>25.10</u>
5.	<u>HOOKTENDER</u>	<u>(2Hrs.)</u>	<u>2x14.59</u>	<u>29.18</u>
6.	<u>LOADING ENGINEER</u>	<u>(2Hrs.)</u>	<u>2x13.76</u>	<u>27.52</u>
7.	<u>TRACTOR OPERATOR (LARGE)</u>	<u>(4HRS.)</u>	<u>4x14.40</u>	<u>57.60</u>
8.	_____	_____	_____	_____
Total Wage Rate . . . . .				\$ <u>244.12</u>

C. General and Administrative Costs  
10% of Machine and Wage Rates\$ 500.16 X 10% . . . . . \$ 50.01D. Total Costs . . . . . \$ 550.17II Misc. Add'l. Costs/Adjustments

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

III Operating CostTotal . . . . . \$ 550

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - RIGGING YARDING AND LOADING - WESTERN OREGONOperations - SKYLINE LOGGING - YARDING - 110' PORTABLE TOWER/YARDERReference for Cost Table ILLUSTRATION 2 TABLE 36 & 37

## I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>110' TOWER w/ SKAGIT YARDER</u> <u>SKYCAR &amp; SINGLE DRUM</u>	<u>71.21</u>	<u>51.08</u>	<u>122.29</u>
2. <u>CHAINSAW</u> <u>FIXED COST 1 HR. OPERATING RATE</u> <u>BASED ON 3 HRS/DAY</u>	<u>.40</u>	<u>318 x .93</u>	<u>0.75</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
Total Machine Rate . . . \$ <u>123.04</u>			
B. <u>Wage Rates (Adjusted Hourly Rate)</u> <u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>	
1. <u>HOOKTENDER</u>	<u>14.59</u>	<u>14.59</u>	
2. <u>YARDER ENGINEER</u>	<u>14.23</u>	<u>14.23</u>	
3. <u>3 CHOKER SETTERS</u>	<u>12.23</u>	<u>36.69</u>	



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4.	<u>CHASER</u>	<u>12.55</u>	<u>12.55</u>
5.	<u>HEAD RIGGER</u>	<u>14.07</u>	<u>14.07</u>
6.			
7.			
8.			

Total Wage Rate . . . . . \$ 92.13

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 215.17 X 10% . . . . . \$ 21.52

D. Total Costs . . . . . \$ 236.69

II Misc. Add'l. Costs/Adjustments

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III Operating Cost:

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 236.69

Per Minute \$ 3.945

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - SKYLINE LOGGING - LOADING 110' TOWER W/YARDER

Reference for Cost Table ILLUSTRATION 2 TABLE 36

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> Machine/Time			
1. <u>BARKO 450 TRACK LOADER</u>	<u>8.59</u>	<u>75x6.16</u>	<u>13.21</u>
<u>FIXED COST PER HOUR PLUS</u>			
* <u>HOURLY OPERATING RATE @ 75%</u>			
2. _____	_____	_____	_____
_____			
3. _____	_____	_____	_____
_____			
4. _____	_____	_____	_____
_____			
5. _____	_____	_____	_____
_____			
6. _____	_____	_____	_____
_____			
Total Machine Rate . . . \$ <u>13.21</u>			

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1. <u>LOADING ENGINEER</u>	<u>13.76</u>	<u>13.76</u>
2. _____	_____	_____
3. _____	_____	_____

SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 13.76

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 26.97 X 10% . . . . . \$ 2.70

D. Total Costs . . . . . \$ 29.67

II Misc. Add'l. Costs/Adjustments

\* Reduction of 25% Operating Time Reflects Waiting  
Time For Yarder & MACHINE DOWN TIME

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Costs

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 29.67

Per Minute \$ 0.494

Remarks:

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - SKYLINE LOGGING - RIGGING COST 1st POLE & ADD'L POLES

## I Determining Hourly Cost

Determining Hourly Cost		Fixed	Operating	Total
A.	<u>Machine Rates</u> <u>Machine/Time</u>			
* 1.	<u>TOWER/YARDING/SKYCAR/DRUM</u> <u>16 HRS FIXED COST</u> <u>6 HRS OPERATING COST</u>	<u>16x17.21</u>	<u>6x4.37</u>	<u>1165.58</u>
2.	<u>CHAINSAW</u> <u>16 HRS FIXED COST</u>	<u>16x4.40</u>		<u>64.00</u>
3.	<u>BARKO 450 TRACK LOADER</u> <u>16 HRS FIXED COST</u> <u>2 HRS OPERATING COST</u>	<u>16x8.59</u>	<u>2x6.16</u>	<u>149.76</u>
** 4.	<u>TRACTOR DOZER DTG</u> <u>11 HRS FIXED COST</u> <u>10 HRS OPERATING COST</u>	<u>11x12.01</u>	<u>10x13.82</u>	<u>270.31</u>
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
Total Machine Rate . . .		\$	<u>1592.05</u>	

\*\*\* B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

1.	<u>HOOKTENDER</u>	<u>(18 Hrs)</u>	<u>14.49</u>	<u>260.82</u>
2.	<u>YARDING ENGINEER</u>	<u>(18 Hrs)</u>	<u>14.23</u>	<u>256.14</u>
3.	<u>3 CHOKER SETTERS</u>	<u>(18 Hrs)</u>	<u>54.12.23</u>	<u>660.42</u>



9353.3 - PRODUCTION COSTS

SCHEDULE 20

4. Chaser	(18 Hrs.)	12.55	255.90
5. Head Rigger	(18 Hrs)	14.07	253.26
6. Loading Engineer	(18 Hrs.)	13.76	247.68
7. Tractor Operator	(8 Hrs.)	14.40)	115.20
8.			

Total Wage Rate . . . . . \$ 2019.42

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 3611.47 X 10% . . . . . \$ 361.15

D. Total Costs . . . . . \$ 3972.62

II Misc. Add'l. Costs/Adjustments

\* 12 Hrs. to rig and 4 Hrs. to tear down ready for

transportation in lieu of operating cost--allowed for

Yarder Skycar.

\*\* 9 Hrs. Machine Time for Landing Construction--7 Hrs. Fixed

Time--1 Hr. OPERATING to assist in RIGGING SINGLE DRUM

\*\*\* Rigging Tower/Yarder--Crew time 16 Hrs. Drum rigging 2 Hrs.

Dozer Operator for Landing Construction & Drum Rigging

III Operating Costs

Total . . . . . \$ 3975

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - SKYLINE LOGGING-RIGGING COST 1ST TAIL HOLD

Reference for Cost Table ILLUSTRATION 2 TABLE 35

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> <u>Machine/Time</u>			
*1.	<u>TOWER/YARDER/SKYCAR/DRUM</u> <u>6 HRS FIXED COSTS</u> <u>6 HRS OPERATING COSTS (FUEL)</u>	<u>6x71.21</u>	<u>6x4.37</u>	<u>453.84</u>
** 2.	<u>TRACTOR DOZER D7G</u> <u>6 HRS FIXED COST</u> <u>2 HRS OPERATING COST</u>	<u>6x12.01</u>	<u>2x13.82</u>	<u>94.70</u>
3.	<u>CHAINSAW</u> <u>1 HR MACHINE COST</u>	<u>0.40</u>	<u>0.93</u>	<u>1.33</u>
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
Total Machine Rate . . .		\$	<u>554.87</u>	

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.	<u>HOOKTENDER</u> <u>6 HRS</u>	<u>14.49</u>	<u>86.94</u>
2.	<u>YARDER ENGINEER</u> <u>6 HRS</u>	<u>14.23</u>	<u>85.38</u>
3.	<u>3 CHOKER SETTERS</u> <u>6 HRS</u>	<u>18x12.23</u>	<u>220.14</u>

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4.	<u>CHASER</u>	<u>(6 Hrs)</u>	<u>12.55</u>	<u>75.30</u>
5.	<u>HEAD RIGGER</u>	<u>(16 Hrs)</u>	<u>14.07</u>	<u>225.12</u>
6.	<u>LOADING ENGINEER</u>	<u>(6 Hrs)</u>	<u>13.76</u>	<u>82.56</u>
7.	<u>TRACTOR OPERATOR (LARGE)</u>	<u>(6 Hrs)</u>	<u>14.40</u>	<u>86.40</u>
8.	_____	_____	_____	_____

Total Wage Rate . . . . . \$ 861.84

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 1416.71 x 10% . . . . . \$ 141.67

D. Total Costs . . . . . \$ 1558.38

II Misc. Add'l. Costs/Adjustments

\* In lieu of operating cost allowance made for fuel of yarder  
SKYCAR.

\*\* Aid in rigging tail holds, anchors, pulling lines etc.

III Operating Cost:

Total . . . . . \$ 1560

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Appendix 1, Page 165  
(C2b21)

Operating Cost Computations

Activity - Rigging, Yarding & Loading - Western Oregon

Operations - Skyline Logging - Rigging Costs - Additional Tail Holds

Reference for Cost Table ILLUSTRATION 2 TABLE 35

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> Machine/Time			
* 1.	<u>TOWER/YARDER/SKYCR/DRUM</u>	<u>6x71.21</u>	<u>6x4.37</u>	<u>453.46</u>
	<u>6 HRS FIXED COST</u>			
	<u>6 HRS OPERATING COSTS (FUEL)</u>			
2.	<u>CHAINSAW</u>	<u>.40</u>	<u>.93</u>	<u>1.33</u>
	<u>1 HR. MACHINE COST</u>			
* x 3.	<u>TRACTOR DOZER DTG</u>	<u>6x12.01</u>	<u>2x13.82</u>	<u>99.70</u>
	<u>6 HRS FIXED COST</u>			
	<u>2 Hrs. Operating Cost</u>			
4.				
5.				
6.				
Total Machine Rate . . .		\$	<u>544.87</u>	

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.	<u>HOOKTENDER (6 HRS)</u>	<u>14.49</u>	<u>86.94</u>
2.	<u>YARDING ENGINEER (6 HRS)</u>	<u>14.23</u>	<u>85.38</u>
3.	<u>3 CHOKER SETTERS (6 HRS)</u>	<u>18x12.23</u>	<u>220.14</u>



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4.	<u>CHASER</u>	<u>(6 HRS)</u>	<u>12.55</u>	<u>75.30</u>
5.	<u>HEAD RIGGER</u>	<u>(6 HRS)</u>	<u>14.07</u>	<u>84.42</u>
6.	<u>TRACTOR OPERATOR (1GE)</u>	<u>(6 HRS)</u>	<u>14.40</u>	<u>86.40</u>
7.	_____	_____	_____	_____
8.	_____	_____	_____	_____

Total Wage Rate . . . . . \$ 638.58C. General and Administrative Costs  
10% of Machine and Wage Rates\$ 1193.45 X 10% . . . . . \$ 119.34D. Total Costs . . . . . \$ 1312.78II Misc. Add'l. Costs/Adjustments+ In lieu of operating cost allowance made for fuel of yarder  
SKYCAR.+ Aid in rigging tail hold anchors, pulling lines etc.III Operating Cost:Total . . . . . \$ 1315

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - HIGHLEAD SWINGING- HOT & COLD DECK SWINGING

Reference for Cost Table ILLUSTRATION 2 TABLE 39 & 41

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>90' TOWER</u> <u>19.32</u> <u>17.76</u> <u>37.08</u> <u>MACHINE RATE/HOUR</u>			
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
Total Machine Rate . . . \$ <u>37.08</u>			

B. <u>Wage Rates</u> (Adjusted Hourly Rate) <u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1. <u>YARDING ENGINEER</u> <u>14.23</u> <u>14.23</u>		
2. <u>CHASER</u> <u>12.55</u> <u>12.55</u>		
3. _____	_____	_____

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 26.78

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 63.86 X 10% . . . . . \$ 6.39

D. Total Costs . . . . . \$ 70.25

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 70.25

Per Hour \$ 70.25

Per Minute \$ 1.171

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

## Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - HIGHLEAD SWINGING - RIGGING COST - SWING POLE

Reference for Cost Table ILLUSTRATION 2 TABLE 40

## I Determining Hourly Cost

		Fixed	Operating	Total
A.	Machine Rates Machine/Time			
1.	90' TOWER 20 HRS. FIXED COST 4 HRS. OPERATING COST	20x19.32	4x17.76	457.44
2.	TRACTOR DOZER D7G LANDING CONSTRUCTION 4 HRS. MACHINE COST	4x120.1	4x13.82	103.32
3.				
4.				
5.				
6.				
Total Machine Rate . . .		\$		560.76

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	Crew Position/Time	Hour Rate	Total
1.	<u>YARDING ENGINEER (20 HRS)</u>	<u>14.23</u>	<u>284.60</u>
2.	<u>CHASER (20 HRS)</u>	<u>12.55</u>	<u>251.00</u>
3.	<u>TRACTOR OPERATOR (4 HRS)</u>	<u>14.40</u>	<u>57.60</u>



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 593.20

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 1153.96 x 10% . . . . . \$ 115.40

D. Total Costs . . . . . \$ 1269.36

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 1270

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON & EASTERN OREGON

Operations - COLD DECK LOADING - BARKO 450 TRACKED

Reference for Cost Table ILLUSTRATION 2 TABLE 42

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> Machine/Time			
* 1.	<u>MOBILE LOADER</u>	<u>8x8.59</u>	<u>8x6.16</u>	<u>118.00</u>
	<u>BARKO 450 TRACK LOADER</u>			
	<u>8 HR MACHINE COST</u>			
2.	_____	_____	_____	_____
	_____			
	_____			
3.	_____	_____	_____	_____
	_____			
	_____			
4.	_____	_____	_____	_____
	_____			
	_____			
5.	_____	_____	_____	_____
	_____			
	_____			
6.	_____	_____	_____	_____
	_____			
	_____			
Total Machine Rate . . .		\$	<u>118.00</u>	

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.	<u>LOADING ENGINEER 8 HRS</u>	<u>8x13.76</u>	<u>110.08</u>
2.	_____	_____	_____
3.	_____	_____	_____

9353.3 - PRODUCTION COSTS

SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 110.08

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 228.08 X 10% . . . . . \$ 22.81

D. Total Costs . . . . . \$ 250.89

II Misc. Add'l. Costs/Adjustments

\* Cost per thousand based on total production of 165 MBF

net loaded per day.

$\$250.89 \div 165 \text{ MBF} = \$1.52/\text{MBF}$

III Operating Costs

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - COLD DECK LOADING - BARKO 450 - RUBBER TIRED

Reference for Cost Table ILLUSTRATION 2 TABLE 42

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> Machine/Time			
*1.	<u>MOBILE LOADER</u> <u>BARKO 450 - RUBBER TIRED</u> <u>8 HRS MACHINE COST</u>	<u>8x9.37</u>	<u>8x6.66</u>	<u>128.24</u>
2.	_____	_____	_____	_____
	_____			
3.	_____	_____	_____	_____
	_____			
4.	_____	_____	_____	_____
	_____			
5.	_____	_____	_____	_____
	_____			
6.	_____	_____	_____	_____
	_____			
Total Machine Rate . . . .		\$	<u>128.24</u>	

B.	<u>Wage Rates</u> (Adjusted Hourly Rate) Crew Position/Time	<u>Hour Rate</u>	<u>Total</u>
1.	<u>LOADING ENGINEER 8 HRS</u>	<u>8x13.76</u>	<u>110.08</u>
2.	_____	_____	_____
3.	_____	_____	_____



SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 110.08

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 238.32 X 10% . . . . . \$ 23.83

D. Total Costs . . . . . \$ 262.15

II Misc. Add'l. Costs/Adjustments

\* Cost per thousand based on total production of 165 MBF

net loaded per day. \$262.15 ÷ 165M = \$1.59/M

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Costs

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON & EASTERN OREGON

Operations - MISC. SMALL SCALE OPERATIONS - LIGHT MOBILE LOADER

BARKO 160 (COLD DECK) LOADING COSTS

Reference for Cost Table ILLUSTRATION 2 TABLE 43

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u>			
	<u>Machine/Time</u>			
*1.	<u>MOBILE LOG LOADER BARKO 160</u>	<u>8x4.21</u>	<u>8x4.04</u>	<u>66.00</u>
	<u>MACHINE OPERATION</u>			
2.				
3.				
4.				
5.				
6.				
Total Machine Rate . . .		\$	<u>66.00</u>	

B.	<u>Wage Rates (Adjusted Hourly Rate)</u>		
	<u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1.	<u>LOADING ENGINEER</u>	<u>8x14.23</u>	<u>113.84</u>
2.			
3.			

9353.3 - PRODUCTION COSTS

SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 113.84

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 179.84 X 10% . . . . . \$ 17.84

D. Total Costs . . . . . \$ 197.68

II Misc. Add'l. Costs/Adjustments

\* Total est. production per 8 hour day = 150 MBF

197.68 ÷ 150 M = \$1.317/M

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Costs

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Per MBF = \$1.32

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - RIGGING YARDING AND LOADING - WESTERN OREGON & EASTERN OREGONOperations - MISC. SMALL SCALE OPERATIONS - RIGGING COST1ST LANDINGReference for Cost Table ILLUSTRATION 2 TABLE 43

## I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> Machine/Time			
1.	<u>BARKO 160 MOBILE LOADER</u> <u>1 HR FIXED COST</u>	<u>4.21</u>		<u>4.21</u>
2.	<u>LOGGING TRUCK/TRACTOR</u> <u>(CARRIER FOR LOADER)</u> <u>1 HR OPERATING COST</u>		<u>9.32</u>	<u>9.32</u>
3.	<u>TRACTOR D7G</u> <u>(ASSIST IN SET UP)</u> <u>1 HR. MACHINE COST</u>	<u>12.01</u>	<u>13.82</u>	<u>25.83</u>
4.	<u>CHAINSAW</u> <u>1 HR FIXED COST</u>	<u>.40</u>		<u>.40</u>
5.				
6.				
Total Machine Rate . . . .		\$	<u>39.76</u>	

B.	<u>Wage Rates</u> (Adjusted Hourly Rate)		
	Crew Position/Time	<u>Hour Rate</u>	<u>Total</u>
* 1.	<u>LOADING ENGINEER (1 HR)</u>	<u>13.76</u>	<u>13.76</u>
2.	<u>CHOKER SETTER (1 HR)</u>	<u>12.23</u>	<u>12.23</u>
3.	<u>TRACTOR OPERATOR (1 Hr)</u>	<u>14.40</u>	<u>14.40</u>



9353.3 - PRODUCTION COSTS

SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 40.39

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 80.15 X 10% . . . . . \$ 8.01

D. Total Costs . . . . . \$ 88.16

II Misc. Add'l. Costs/Adjustments

Western Oregon wages used. However rigging costs may be  
considered to be identical for western & eastern Oregon  
\* Loading engineer drives logging truck carrier for loader  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Costs

Total . . . . . \$ 90

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

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(C2b27)

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON & EASTERN OREGON

Operations - MISC. SMALL SALE OPERATIONS - RIGGING COST-

ADD'L LANDINGS

Reference for Cost Table ILLUSTRATION 2 TABLE 43

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> Machine/Time			
1.	<u>BARKO 160 MOBILE LOG</u> <u>LOADER</u> <u>1/2 HR. FIXED COST</u>	<u>1/2x 4.21</u>		<u>2.10</u>
2.	<u>LOGGING TRUCK/TRACTOR</u> <u>CARRIER FOR LOADER</u> <u>1/2 HR. OPERATING COST</u>		<u>1/2x 9.32</u>	<u>4.66</u>
3.	<u>TRACTOR CAT D7 G</u> <u>ASSIST IN SET UP</u> <u>1/2 HR MACHINE COST</u>	<u>1/2x 12.01</u>	<u>1/2x 13.82</u>	<u>12.91</u>
4.	<u>CHAINSAW</u> <u>1/2 HR. FIXED COST</u>	<u>1/2x .40</u>		<u>.20</u>
5.				
6.				
Total Machine Rate . . .		\$	<u>19.87</u>	

B.	<u>Wage Rates</u> (Adjusted Hourly Rate) Crew Position/Time	<u>Hour Rate</u>	<u>Total</u>
* 1.	<u>LOGGING ENGINEER (1/2 HR.)</u>	<u>13.76</u>	<u>6.88</u>
2.	<u>CHOKER SETTER (1/2 HR.)</u>	<u>12.23</u>	<u>6.12</u>
3.	<u>TRACTOR OPERATOR (1/2 HR.)</u>	<u>14.40</u>	<u>7.20</u>

9353.3 - PRODUCTION COSTS

SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 20.20

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 39.74 X 10% . . . . . \$ 3.97

D. Total Costs . . . . . \$ 43.71

II Misc. Add'l. Costs/Adjustments

Western Oregon wages used. However rigging costs may be  
considered to be identical for western & eastern Oregon.

\* Loading engineer drives logging truck for loader.

III Operating Costs

Total . . . . . \$ 45

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - MISC. SMALL SALE OPERATION- YARDING BY YARDER-LOADER

Reference for Cost Table ILLUSTRATION 2 TABLE 44

A. Machine Rates		Fixed	Operating	Total
Machine/Time				
1.	SJ-5R USED EQUIPMENT YARDER-LOADER MACHINE RATE	11.90	10.20	22.10
2.	CHAINSAW FIXED COST + 3HRS. PER DAY OPERATING COST	.40	3/8 x .93	.75
3.				
4.				
5.				
6.				
Total Machine Rate . . .		\$	22.85	

B.	<u>Wage Rates</u> (Adjusted Hourly Rate)	<u>Hour Rate</u>	<u>Total</u>
	<u>Crew Position/Time</u>		
1.	<u>LOADING ENGINEER</u>	<u>13.76</u>	<u>13.76</u>
2.	<u>CHOKER SETTER</u>	<u>12.23</u>	<u>12.23</u>
3.	<u>CHASER</u>	<u>12.55</u>	<u>12.55</u>



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 38.54

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 61.39 X 10% . . . . . \$ 6.14

D. Total Costs . . . . . \$ 67.53

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Costs

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 67.53

Per Minute \$ 1.125

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

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(C2b29)

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - EASTERN OREGON

Operations - MISC. SMALL SALES - YARDING BY YARDER/LOADER

Reference for Cost Table ILLUSTRATION 2 TABLE 44

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> Machine/Time			
1.	<u>SU-SR YARDER LOADER</u> <u>USED EQUIPMENT</u> <u>MACHINE RATE</u>	<u>11.90</u>	<u>10.20</u>	<u>22.10</u>
2.	<u>CHAINSAW</u> <u>FIXED COST PLUS 3 HRS. PER DAY</u> <u>OPERATING COST</u>	<u>0.40</u>	<u>318 x .93</u>	<u>0.75</u>
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
Total Machine Rate . . . . \$			<u>22.85</u>	

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.	<u>LOADER OPERATOR</u>	<u>14.34</u>	<u>14.34</u>
2.	<u>CHOKER SETTER</u>	<u>11.72</u>	<u>11.72</u>
3.	<u>CHASER</u>	<u>11.65</u>	<u>11.65</u>

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 37.71

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 60.56 X 10% . . . . . \$ 6.06

D. Total Costs . . . . . \$ 66.62

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost:

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 66.62

Per Minute \$ 1.11

Remarks:

9353.3 -- PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - MISC. SMALL SCALE OPERATIONS - RIGGING COST

YARDER/LOADER - RIGGED FOR HIGHHEAD YARDING

Reference for Cost Table ILLUSTRATION 2 TABLE #5

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> Machine/Time			
1.	<u>SU-5R USED EQUIPMENT</u>	<u>11.90</u>	<u>10.20</u>	<u>22.10</u>
	<u>YARDER/LOADER</u>			
	<u>1 HR MACHINE RATE</u>			
2.	<u>CHAINSAW</u>	<u>0.40</u>		<u>0.40</u>
	<u>1 HR FIXED COST</u>			
3.				
4.				
5.				
6.				

Total Machine Rate . . . \$ 22.50

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.	<u>LOADING ENGINEER</u>	<u>13.76</u>	<u>13.76</u>
2.	<u>CHOKER SETTER</u>	<u>12.23</u>	<u>12.23</u>
3.	<u>CHASER</u>	<u>12.55</u>	<u>12.55</u>



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 38.54

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 61.04 X 10% . . . . . \$ 6.10

D. Total Costs . . . . . \$ 67.14

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 67

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Appendix 1, Page 187  
(C2b31)

Operating Cost Computations

Activity - RIGGING YARDING & LOADING---EASTERN OREGON

Operations - Misc. Small Sale Operations -- Rigging Cost For Yarder/Loader

Reference for Cost Table Illustration 2 Table 45

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> Machine/Time			
1. <u>SJ-5R Used Equipment Yarder-Loader</u> <u>1 Hour Machine Cost</u>	<u>11.90</u>	<u>10.20</u>	<u>22.10</u>
2. <u>Chainsaw</u> <u>1 Hour Fixed Cost</u>	<u>.40</u>		<u>.40</u>
3. _____ _____	_____	_____	_____
4. _____ _____	_____	_____	_____
5. _____ _____	_____	_____	_____
6. _____ _____	_____	_____	_____
Total Machine Rate . . .	\$	<u>22.50</u>	

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1. <u>Loader Operator</u>	<u>14.34</u>	<u>14.34</u>
2. <u>Choker Setter</u>	<u>11.72</u>	<u>11.72</u>
3. <u>Chaser</u>	<u>11.65</u>	<u>11.65</u>

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 37.71

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 60.21 X 10% . . . . . \$ 6.02

D. Total Costs . . . . . \$ 66.23

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 66

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 PRODUCTION COSTS  
SCHEDULE 20

Appendix 1, Page 189  
(C2b32)

Operating Cost Computations

Activity - RIGGING YARDING & LOADING--WESTERN & EASTERN OREGON

Operations - Misc. Small Sale Operations--

Loading By Yarder/Loader

Reference for Cost Table Illustration 2 Table 45

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> Machine/Time			
1. <u>SJ-5R (Used Equipment)</u> _____	8x11.90	8x 10.20	176.80
<u>Yarder-Loader</u> _____			
<u>8 Hour Production Day</u> _____			
2. _____			
_____			
_____			
3. _____			
_____			
_____			
4. _____			
_____			
_____			
5. _____			
_____			
_____			
6. _____			
_____			
_____			

Total Machine Rate . . . \$ 176.80

B. <u>Wage Rates</u> (Adjusted Hourly Rate)		<u>Hour Rate</u>	<u>Total</u>
Crew Position/Time			
1. <u>Loading Engineer</u> (8 Hrs.)	8x13.76		110.08
2. <u>Choker Setter</u> (8 Hrs.)	8x12.23		97.84
3. <u>Chaser</u> (8 Hrs.)	8x12.55		100.40



9353.3 - PRODUCTION COSTS

SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 308.32

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 485.12 X 10% . . . . . \$ 48.51

D. Total Costs . . . . . \$ 533.63

II Misc. Add'l. Costs/Adjustments

Western Oregon wage rates used--however costs may be considered  
identical for western & eastern Oregon.

Adjustment to cost per M (net log scale loaded)

Total production per 8 hour day = 165 MBF

\$533.63 -- 165 MBF = \$3.23

III Operating Costs

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ \_\_\_\_\_

\$ 3.23/MBF

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - COMMERCIAL THINNINGS-YARDING w/LIGHT

CRAWLER TRACTOR

Reference for Cost Table ILLUSTRATION 2 TABLE 46

I Determining Hourly Cost

A. Machine Rates  
Machine/Time

Fixed Operating Total

1. LIGHT YARDING TRACTOR D4D 4.64 4.31 8.95  
MACHINE RATE 1 HR

2. CHAINSAW 0.40 28x.93 0.63  
FIXED COST PLUS 2 HRS  
OPERATING COST PER DAY

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

Total Machine Rate . . . \$ 9.58

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

Hour Rate Total

\* 1. TRACTOR OPERATOR (SM) 13.82 13.82

2. \_\_\_\_\_

3. \_\_\_\_\_

9353.3 - PRODUCTION COSTS

SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 13.82

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 23.40 X 10% . . . . . \$ 2.34

D. Total Costs . . . . . \$ 25.74

II Misc. Add'l. Costs/Adjustments

\* Tractor operator--setting & releasing chokers

Adjustment factor--Delay factor for complete skidding

cycle from PNW-41 = 38.5%; \$25.74 x 1.385 = \$35.64

III Operating Costs

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 35.64

Per Minute \$ 0.594

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - RIGGING YARDING AND LOADING - WESTERN OREGONOperations - COMMERCIAL THINNING - YARDING W/4 WHEEL SKIDDERReference for Cost Table ILLUSTRATION 2 TABLE 47

## I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> Machine/Time			
1.	<u>4 WHEEL SKIDDER JOHN DEERE 440B</u> <u>MACHINE RATE 1 HR</u>	<u>4.10</u>	<u>5.47</u>	<u>9.57</u>
2.	<u>CHAINSAW</u> <u>FIXED COST PLUS 2 HRS.</u> <u>OPERATING RATE PER DAY</u>	<u>0.40</u>	<u>2/8 x .93</u>	<u>0.63</u>
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
Total Machine Rate . . . .		\$	<u>10.20</u>	

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
*1.	<u>TRACTOR OPERATOR (SM)</u>	<u>13.82</u>	<u>13.82</u>
2.	_____	_____	_____
3.	_____	_____	_____



9353.3 - PRODUCTION COSTS

SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 13.82

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 24.02 X 10% . . . . . \$ 2.40

D. Total Costs . . . . . \$ 26.42

II Misc. Add'l. Costs/Adjustments

\* Skidder operator--setting & releasing chokers

Adjustment factor--Delay factor for complete skidding cycle

from PNW-41 = 38.5%-----26.42 x 1.385 = 36.59

III Operating Costs

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 36.59

Per Minute \$ 0.61

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - COMMERCIAL THINNINGS- LOADING

Reference for Cost Table ILLUSTRATION 2 TABLE 48

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>LIGHT MOBILE LOADER</u>	<u>4.21</u>	<u>4.04</u>	<u>8.25</u>
<u>BARKO 160</u>			
<u>MACHINE RATE (1 Hr)</u>			
2. <u>CHAINSAW</u>	<u>0.40</u>	<u>3/8 x .93</u>	<u>0.75</u>
<u>FIXED COST PLUS OPERATING COST</u>			
<u>FOR 3 HRS/DAY</u>			
3. _____	_____	_____	_____
_____			
_____			
4. _____	_____	_____	_____
_____			
_____			
5. _____	_____	_____	_____
_____			
_____			
6. _____	_____	_____	_____
_____			
_____			
Total Machine Rate . . . . .	\$	<u>9.00</u>	

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1. <u>LOADING ENGINEER</u>	<u>13.76</u>	<u>13.76</u>
2. <u>CHASER</u>	<u>12.55</u>	<u>12.55</u>
3. _____	_____	_____

9353.3 - PRODUCTION COSTS

SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 26.31

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 35.31 X 10% . . . . . \$ 3.52

D. Total Costs . . . . . \$ 35.84

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Costs

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 35.84

Per Minute \$ 0.647

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

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(C2b36)

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - COMMERCIAL THINNINGS - RIGGING COST

CRAWLER TRACTOR

1<sup>ST</sup> LANDING

Reference for Cost Table ILLUSTRATION 2 TABLE 49

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> <u>Machine/Time</u>			
1.	<u>2 LIGHT TRACTORS D4D</u> <u>4 HRS. FIXED COST</u>	<u>8x4.64</u>		<u>37.12</u>
2.	<u>CHAINSAW</u> <u>5 HRS. FIXED COST</u>	<u>5x.40</u>		<u>2.00</u>
3.	<u>LIGHT MOBILE LOADER BARKO 160</u> <u>2 HRS. MACHINE COST</u>	<u>2x4.64</u>	<u>2x4.04</u>	<u>16.50</u>
4.	<u>LIGHT TRACTOR CAT D4D</u> <u>LANDING CONSTRUCTION</u> <u>2 HRS. MACHINE RATE</u>	<u>2x4.64</u>	<u>2x4.31</u>	<u>17.90</u>
5.				
6.				
Total Machine Rate . . .				\$ <u>73.52</u>

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.	<u>2 TRACTOR OPERATORS (SMALL)</u> <u>(5 HRS EACH)</u>	<u>10x13.82</u>	<u>138.20</u>
2.	<u>LOADING ENGINEER (2 HRS)</u>	<u>2x13.76</u>	<u>27.52</u>
3.			



9353.3 - PRODUCTION COSTS

SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 165.72

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 239.24 X 10% . . . . . \$ 23.92

D. Total Costs . . . . . \$ 263.16

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Costs

Total . . . . . \$ 265

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - RIGGING YARDING AND LOADING - WESTERN OREGONOperations - COMMERCIAL THINNINGS - RIGGING COST-CRAWLER TRACTORADD'L LANDINGReference for Cost Table ILLUSTRATION 2 TABLE 79

## I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>2 LIGHT TRACTORS CAT D4D</u> <u>1 HR. MACHINE COST</u>	<u>2x4.64</u>	<u>2x4.31</u>	<u>17.90</u>
2. <u>CHAINSAW</u> <u>1/2 HR. MACHINE COST</u>	<u>1/2x.40</u>		<u>.20</u>
3. <u>LIGHT MOBILE LOADER -</u> <u>BARKO 160</u> <u>1 HR. MACHINE RATE</u>	<u>4.64</u>	<u>4.04</u>	<u>8.68</u>
4. <u>LIGHT TRACTOR CAT D4D</u> <u>LANDING CONSTRUCTION</u> <u>2 HR. MACHINE COST</u>	<u>2x4.64</u>	<u>2x4.31</u>	<u>17.90</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
Total Machine Rate . . . \$ <u>44.68</u>			

B. Wage Rates (Adjusted Hourly Rate)

<u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1. <u>2 TRACTOR OPERATORS (5m) (2 Hrs)</u>	<u>4x13.82</u>	<u>55.28</u>
2. <u>LOADING ENGINEER (1 HR)</u>	<u>13.76</u>	<u>13.76</u>
3. _____	_____	_____

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 69.04

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 113.72 X 10% . . . . . \$ 11.37

D. Total Costs . . . . . \$ 125

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 125

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - RIGGING YARDING AND LOADING - WESTERN OREGON

Operations - COMMERCIAL THINNINGS - RIGGING COST - WHEEL SKIDDER

1<sup>ST</sup> LANDING

Reference for Cost Table ILLUSTRATION 2 TABLE 49

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> <u>Machine/Time</u>			
1.	<u>2 RUBBER TIRED 4 WHEEL SKIDDER</u> <u>8x4.10</u>			<u>32.80</u>
	<u>JOHN DEERE 440B</u>			
	<u>4 HRS. FIXED COST</u>			
2.	<u>CHAINS AW</u>	<u>5x.40</u>		<u>2.00</u>
	<u>5 HR FIXED COSTS</u>			
3.	<u>LIGHT MOBILE LOADER</u> <u>2x4.64</u>	<u>2x4.04</u>		<u>17.36</u>
	<u>BARKO MODEL 160</u>			
	<u>2 HR. MACHINE COSTS</u>			
4.	<u>WHEEL SKIDDER W/BLADE JD440B</u> <u>3x4.10</u>	<u>3x5.47</u>		<u>28.71</u>
	<u>LANDING CONSTRUCTION</u>			
	<u>3 HRS. MACHINE RATE</u>			
5.				
6.				
Total Machine Rate . . . \$				<u>80.87</u>

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.	<u>2 TRACTOR OPERATORS (SMALL) (6 HRS)</u>	<u>12x13.82</u>	<u>165.84</u>
2.	<u>LOADING ENGINEER (2 HRS)</u>	<u>2x13.76</u>	<u>27.52</u>
3.			



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 193.36

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 274.23 X 10% . . . . . \$ 27.42

D. Total Costs . . . . . \$ 301.65

II Misc. Ad3'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 300

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - RIGGING YARDING AND LOADING - WESTERN OREGONOperations - COMMERCIAL THINNINGS - RIGGING COSTS - WHEEL SKIDDERADD'L LANDINGSReference for Cost Table ILLUSTRATION 2 TABLE 49

## I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>2 RUBBER TIED 4/WHEEL SKIDDER</u> <u>2x4.10</u> <u>2x5.47</u> <u>19.14</u> <u>JOHN DEERE 440B</u> <u>1 HR. MACHINE RATE</u>			
2. <u>CHAINSAW</u> <u>.5x.40</u> <u></u> <u>0.20</u> <u>1/2 HR FIXED COST</u>			
3. <u>LIGHT MOBILE LOADER</u> <u>1x4.64</u> <u>1x4.04</u> <u>8.68</u> <u>BARK MODEL 160</u> <u>1 HR MACHINE RATE</u>			
4. <u>WHEEL SKIDDER W/BLADE</u> <u>3x4.10</u> <u>3x5.47</u> <u>28.71</u> <u>J.D. 440B. LANDING CONSTRUCTION</u> <u>3 HRS. MACHINE RATE</u>			
5. _____	_____	_____	_____
6. _____	_____	_____	_____
Total Machine Rate . . . \$			<u>56.73</u>

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1. <u>2 TRACTOR OPERATORS (SM) (2HRS)</u> <u>4x13.82</u> <u>55.28</u>		
2. <u>LOADING ENGINEER (1HR)</u> <u>13.76</u> <u>13.76</u>		
3. _____	_____	_____

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 69.04

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 125.77 X 10% . . . . . \$ 12.58

D. Total Costs . . . . . \$ 138.35

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost:

Total . . . . . \$ 140

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

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(C2c1)

Operating Cost Computations

Activity - TRANSPORTATION - WESTERN & EASTERN OREGON

Operations - TRUCK HAULING - OPERATING COST

Reference for Cost Table ILLUSTRATION 3 TABLE 1

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>Truck-White Model 4964</u> <u>W/Peerless Trailer</u> <u>Machine Rate</u>	<u>6.59</u>	<u>7.32</u>	<u>15.91</u>
2. _____ _____ _____	_____	_____	_____
3. _____ _____ _____	_____	_____	_____
4. _____ _____ _____	_____	_____	_____
5. _____ _____ _____	_____	_____	_____
6. _____ _____ _____	_____	_____	_____
Total Machine Rate . . .	\$	<u>15.91</u>	

B. <u>Wage Rates</u> (Adjusted Hourly Rate) <u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1. <u>Truck Driver</u>	<u>11.62</u>	<u>11.62</u>
2. _____	_____	_____
3. _____	_____	_____



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 11.62

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 27.53 x 10% . . . . . \$ 2.75

D. Total Costs . . . . . \$ 30.28

II Misc. Add'l. Costs/Adjustments

ADJUSTMENT

HOURLY COST FOR STRAIGHT TIME

HOURLY COST FOR OVERTIME

The Truck Drivers Overtime Wage Rate - \$13.42

Overtime Rate= Machine Rate + Truck Drivers Overtime Rate Per Hr.

= 15.91 + 13.42

= 29.33/Hr x 10% G & A Costs

= 32.26/4. Overtime

= 538/MIN

III Operating Cost:

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 30.28 Straight Time

Per Minute \$ 0.505 Straight Time

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Appendix 1, Page 207  
(C2c2)

Operating Cost Computations

Activity - TRANSPORTATION - WESTERN & EASTERN OREGON

Operations -TRUCK HAULING - DELAY COST

Reference for Cost Table ILLUSTRATION 3 TABLE 1

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>Truck-White Model 4964</u>	<u>6.59</u>		<u>6.59</u>
<u>W/Peerless Trailer</u>			
<u>Fixed Cost 1 hr</u>			
2. _____			
3. _____			
4. _____			
5. _____			
6. _____			
Total Machine Rate . . .	\$	<u>6.59</u>	

B. <u>Wage Rates</u> (Adjusted Hourly Rate)		
<u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1. <u>Truck Driver</u>	<u>11.62</u>	<u>11.62</u>
2. _____		
3. _____		

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 11.62

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 18.21 X 10% . . . . . \$ 1.82

D. Total Costs . . . . . \$ 20.03/Hr.

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Costs:

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 20.03

Per Minute \$ 0.334

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost Computations

Activity - ROAD CONSTRUCTION AND MAINTENANCE

Operations - EQUIPMENT MOVE-IN (1) BASIC CONSTRUCTION UNIT

Reference for Cost Table ILLUSTRATION 4/ TABLE 2

## I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>Tractor Mounted Dozer D8K</u> <u>79000 lbs. complete 68200 lbs. W/O</u> <u>Blade-8 Hours Fixed Cost</u>	<u>8x17.25</u>		<u>138.00</u>
2. <u>Lowboy-For Hauling Tractor W/O Blade</u> <u>PUC Rate .28/cwt (30 mile haul)</u> <u>.28/cwt X 68200 lbs.</u>			<u>190.96</u>
3* <u>Lowboy-For Hauling Tractor Blade,</u> <u>Compressor &amp; Track Drill</u> <u>PUC Rate .41/cwt X 27,800 lbs.</u>			<u>113.98</u>
4. <u>Lowboy Empty mileage charge</u> <u>PUC Rate 60 miles 2 carriers</u> <u>120 Miles X 0.92</u>			<u>110.40</u>
5. <u>Flag Car Commercial Rate</u> <u>70 Miles R/Trip 2 Flag Cars</u> <u>.18/ Mile X 140 Miles =25.20</u> <u>3.50/hr X 8 Hrs. = 28.00</u>			<u>53.20</u>
6. <u>Motor Grader Cat No. 12 F</u> <u>3 Hour Machine Rate</u>	<u>3x4.1</u>	<u>3x4.98</u>	<u>28.05</u>

Total Machine Rate . . . . \$ 634.59

B. <u>Wage Rates (Adjusted Hourly Rate)</u> <u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1. <u>Tractor Dozer Oper. (8 Hrs.)</u>	<u>14.40</u>	<u>115.20</u>
2. <u>Chaser (8 Hrs.)</u>	<u>12.55</u>	<u>100.40</u>
3. <u>Drill Operator (2 Hrs.)</u>	<u>13.74</u>	<u>27.48</u>



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4.	Labor	(2 Hrs.)	11.12	22.24
5.	Motor Grader Operator	(3 Hrs.)	13.38	40.14
6.				
7.				
8.				

Total Wage Rate . . . . . \$ 305.46

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 886.85 X 10% . . . . . \$ 88.68

D. Total Costs . . . . . \$ 1028.72

II Misc. Add'l. Costs/Adjustments

✓ G&A Cost Not Allowed On Cost of Flag Car.

\* Machine Rate & Delay Costs Not Allowed For Compressor

and Track Drill-As Rental Rate Applies To Actual Operation Time

(Clock Time) Only

III Operating Cost:

Total . . . . . \$ 1030

Per Hour \$

Per Minute \$

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost Computations

Activity - ROAD CONSTRUCTION AND MAINTENANCE

Operations - EQUIPMENT MOVE-IN (2) TRACTOR DOZER

Reference for Cost Table ILLUSTRATION 4 TABLE 2

## I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>TRACTOR MOUNTED DOZER D8K</u> <u>78000 lbs. complete</u> <u>8 Hours Fixed Cost</u>	<u>8x17.25</u>		<u>138.00</u>
2. <u>Lowboy For Hauling Tractor</u> <u>PUC Rate .28/cwt</u> <u>.28/cwt X 79000</u>			<u>221.20</u>
3. <u>Lowboy-Empty Charge</u> <u>PUC Rate .92/Mile</u> <u>60 Miles X .92</u>			<u>55.20</u>
4. <u>Flag Cars Commercial Rate</u> <u>70 Miles R/T Use 2 cars</u> <u>0.18/Mile X 140 Miles=25.20</u> <u>Drivers-\$3.50/hr X 8 hrs = 28.00</u>			<u>53.20</u>
5. _____ _____ _____	_____	_____	_____
6. _____ _____ _____	_____	_____	_____
Total Machine Rate . . .			\$ <u>467.60</u>

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1. <u>TRACTOR DOZER OPR.</u> (8 Hrs.) <u>14.40</u>		<u>115.20</u>
2. <u>CHASER</u> (8 Hrs) <u>12.55</u>		<u>110.40</u>
3. _____	_____	_____

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 225.60

C. General and Administrative Costs  
10% of Machine and Wage Rates

1/ \$ 640.00 X 10% . . . . . \$ 64.00

D. Total Costs . . . . . \$ 757.20

II Misc. Add'l. Costs/Adjustments

1/ G&A COST NOT ALLOWED ON COST OF FLAG CAR  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 760

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - ROAD CONSTRUCTION AND MAINTENANCEOperations - EQUIPMENT MOVE-IN AIR COMPRESSOR & TRACK DRILLReference for Cost Table ILLUSTRATION 4 TABLE 2

## I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>AIR COMPRESSOR &amp; TRACK DRILL</u> <u>BASED ON RENTAL RATE 600 CEM</u> <u>COMPRESSOR &amp; 3 1/2" TRACK DRILL</u>	<u>NO FIXED COST ON RENTAL EQUIPMENT</u>		
2. <u>LOWBOY FOR HAULING COMPRESSOR</u> <u>&amp; TRACK DRILL - PUC RATE</u> <u>.41/CWT x 16000*</u>			<u>68.06</u>
3. <u>LOWBOY - EMPTY MILEAGE CHARGE</u> <u>PUC RATE 0.92/MI. x 60 MILES</u>			<u>55.20</u>
4. _____			
5. _____			
6. _____			
Total Machine Rate . . . . \$ _____			

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1. <u>DRILL OPERATOR (2 HRS)</u>	<u>13.74</u>	<u>27.48</u>
2. <u>LABOR (2 HRS)</u>	<u>11.12</u>	<u>22.24</u>
3. _____		



9353.3 - PRODUCTION COSTS

SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 49.72

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 172.98 X 10% . . . . . \$ 17.30

D. Total Costs . . . . . \$ 190.28

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Costs

Total . . . . . \$ 190

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - ROAD CONSTRUCTION AND MAINTENANCEOperations - EQUIPMENT MOVE-IN MOTOR GRADERReference for Cost Table ILLUSTRATION 4 TABLE 2

## I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>MOTOR GRADER CAT 12F</u> <u>3x441</u>		<u>3x494</u>	<u>2805</u>
<u>3 HOUR MACHINE RATE</u>			
2. _____	_____	_____	_____
_____			
_____			
3. _____	_____	_____	_____
_____			
_____			
4. _____	_____	_____	_____
_____			
_____			
5. _____	_____	_____	_____
_____			
_____			
6. _____	_____	_____	_____
_____			
_____			
Total Machine Rate . . .	\$	<u>28.05</u>	

B. <u>Wage Rates</u> ( <u>Adjusted Hourly Rate</u> )		
<u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1. <u>GRADER OPERATOR (3 HRS)</u>	<u>3x13.38</u>	<u>40.14</u>
2. _____	_____	_____
3. _____	_____	_____

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 40.14

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 68.19 X 10% . . . . . \$ 6.82

D. Total Costs . . . . . \$ 75.01

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 75.00

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - ROAD CONSTRUCTION AND MAINTENANCEOperations - EQUIPMENT MOVE-IN WHEEL SCRAPERReference for Cost Table ILLUSTRATION 4 TABLE 2

## I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
	<u>NO FIXED COST ON</u>		
1. <u>SCRAPER 12 TO 19 C.Y. CAPACITY</u> <u>BASED ON RENTAL RATE</u> <u>42,000 Lbs</u>		<u>RENTAL EQUIP.</u>	
2. <u>LOWBOY - FOR HAULING SCRAPER</u> <u>P.U.C. RATE .36 / CWT</u> <u>.36 / CWT X 42000 LBS</u>			<u>151.20</u>
3. <u>LOWBOY - EMPTY MILEAGE CHARGE</u> <u>P.U.C. RATE .92 / MI</u> <u>60 MILES X 0.92 / MI</u>			<u>55.20</u>
4. <u>FLAG CAR - COMMERCIAL RATE</u> <u>70 MILES @ .18 / MI = 12.60</u> <u>DRIVER 3.50 / HR X 4 HRS = 14.00</u>			<u>26.60</u>
5. _____			
6. _____			
Total Machine Rate . . . \$			<u>233.00</u>

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1. <u>SCRAPER OPER (2 HRS)</u> <u>(GRADER OPER)</u>	<u>13.38</u>	<u>26.76</u>
2. _____		
3. _____		



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 26.76

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 259.76 X 10% . . . . . \$ 25.98

D. Total Costs . . . . . \$ 285.74

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 285.00

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

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(C2d1)

Operating Cost Computations

Activity - ROAD CONSTRUCTION AND MAINTENANCE

Operations - EQUIPMENT MOVE-IN 3/4 YARD SHOVEL

Reference for Cost Table ILLUSTRATION 4 TABLE 2

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>SHOVEL-3/4 YARD CAPACITY</u> <u>BASED ON RENTAL RATE</u> <u>47000 LBS.</u>	<u>NO FIXED COST ON</u> <u>RENTAL EQUIPMENT</u>		
2. <u>LOWBOY-FOR HAULING SHOVEL</u> <u>PUC RATE .36/CWT</u> <u>.36/CWT X 47000 LBS</u>			<u>169.20</u>
3. <u>LOWBOY-EMPTY MILEAGE CHARGE</u> <u>PUC RATE .98/MI X MILES</u>			<u>55.20</u>
4. <u>FLAG CAR COMMERCIAL</u> <u>RATE - 70 MILES</u>			<u>26.60</u>
5. _____			
6. _____			
Total Machine Rate . . . \$			<u>251.00</u>

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1. <u>SHOVEL OPERATOR (2 HRS)</u>	<u>2 x 14.05</u>	<u>28.10</u>
2. _____		
3. _____		

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 28.10

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 252.50 X 10% . . . . . \$ 25.25

D. Total Costs . . . . . \$ 304.35

II Misc. Add'l. Costs/Adjustments

1/ G&A COST NOT ALLOWED ON COST OF FLAG CAR  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

II Operating Cost

Total . . . . . \$ 305

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Appendix 1, Page 221  
(C2d1)

Operating Cost Computations

Activity - ROAD CONSTRUCTION AND MAINTENANCE

Operations - EQUIPMENT MOVE-IN VIBRATORY ROLLER

Reference for Cost Table ILLUSTRATION 4 TABLE 2

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>VIBRATORY ROLLER 27 TO 36 HP</u> <u>BASED ON RENTAL RATE - 10000 LBS</u>	<u>NO FIXED COST ON RENTAL EQUIPMENT</u>		
2. <u>LOWBOY FOR HAULING ROLLER</u> <u>PUL RATE 0.4/CWT X 10000 LBS</u>			<u>41.00</u>
3. <u>LOWBOY-EMPTY MILAGE CHARGE</u> <u>PUL RATE 0.1/MIL X 60 MILES</u>			<u>55.20</u>
4. _____			
5. _____			
6. _____			
Total Machine Rate . . . \$			<u>96.20</u>

B. <u>Wage Rates</u> (Adjusted Hourly Rate) <u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1. <u>LABOR (HELPER) (3 HRS)</u>	<u>11.12</u>	<u>33.36</u>
2. _____		
3. _____		



## SCHEDULE 20

4. \_\_\_\_\_  
 5. \_\_\_\_\_  
 6. \_\_\_\_\_  
 7. \_\_\_\_\_  
 8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 33.36

C. General and Administrative Costs  
 10% of Machine and Wage Rates

\$ 129.56 X 10% . . . . . \$ 12.96

D. Total Costs . . . . . \$ 142.52

II Misc. Add'l. Costs/Adjustments

Roller to be pulled by tractor or other equipment already on

job. If such equipment not available --allow appropriate

Move-In-Costs

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

III Operating Costs

Total . . . . . \$ 145

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Appendix 1, Page 223  
(C2d1)

Operating Cost Computations

Activity - ROAD CONSTRUCTION AND MAINTENANCE

Operations - EQUIPMENT MOVE-IN GRID ROLLER

Reference for Cost Table ILLUSTRATION 4 TABLE 2

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>GRID ROLLER - 16 TONS</u> <u>NO FIXED COST ON RENTAL EQUIP</u> <u>BASED ON RENTAL RATE</u> <u>32000 LBS</u>			
2. <u>LOWBOY-FOR HAULING ROLLER</u> <u>131.20</u> <u>PUC RATE 41/CWT x 32000 lbs</u>			
3. <u>LOWBOY-EMPTY MILEAGE CHARGE</u> <u>55.20</u> <u>PUC RATE .92/M1</u>			
4. _____			
5. _____			
6. _____			
Total Machine Rate . . . \$ _____			

B. <u>Wage Rates</u> (Adjusted Hourly Rate)		
<u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1. <u>LABOR (HELPER) (3 HRS)</u> <u>11.12</u> <u>33.36</u>		
2. _____		
3. _____		

9353.3 - PRODUCTION COSTS

SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 33.36

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 219.76 X 10% . . . . . \$ 21.98

D. Total Costs . . . . . \$ 241.74

II Misc. Add'l. Costs/Adjustments

Roller to be pulled by tractor or other equipment already on

job. If such equipment not available---allow appropriate

Move-In-Costs

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

III Operating Costs

Total . . . . . \$ 240

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Appendix 1, Page 225  
(C2d1)

Operating Cost Computations

Activity - ROAD CONSTRUCTION AND MAINTENANCE

Operations - EQUIPMENT MOVE-IN DUMP TRUCK

Reference for Cost Table ILLUSTRATION 4 TABLE 2

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> Machine/Time			
1.	<u>DUMP TRUCK NORMAL DUTY</u> <u>8 to 12 C.Y CAPACITY</u> <u>BASED ON RENTAL RATE</u>		<u>2x22.45</u>	<u>44.90</u>
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
Total Machine Rate . . .		\$	<u>44.90</u>	

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.	<u>DUMP TRUCK OPER. (2 HRS)</u>	<u>2x 12.46</u>	<u>24.92</u>
2.	_____	_____	_____
3.	_____	_____	_____



SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 24.92

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 69.82 X 10% . . . . . \$ 6.98

D. Total Costs . . . . . \$ 76.80

II Misc. Add'l. Costs/Adjustments

Move-In based on operator driving truck to job.

Rental rates include all costs such as license fee etc.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Costs

Total . . . . . \$ 75

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Appendix 1, Page 227  
(C2d1)

Operating Cost Computations

Activity - ROAD CONSTRUCTION AND MAINTENANCE

Operations - EQUIPMENT MOVE-IN LIGHT (Misc) TRACTOR

Reference for Cost Table ILLUSTRATION 4 TABLE 2

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u>			
	Machine/Time			
1.	<u>LIGHT CRAWLER TRACTOR D4D</u>	<u>2x4.64</u>		<u>9.28</u>
	<u>2 HR DELAY</u>			
	<u>30000 LBS</u>			
2.	<u>LOWBOY-FOR HAULING TRACTOR</u>			<u>123.00</u>
	<u>PULG RATE .41/CWT x 30000 LBS</u>			
3.	<u>LOWBOY-EMPTY MILEAGE CHARGE</u>			<u>55.20</u>
	<u>PULG RATE .92/MT x 60 MILES</u>			
4.				
5.				
6.				
Total Machine Rate . . .		\$		

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.	<u>TRACTOR OPER (S.M) 2 HRS</u>	<u>13.82</u>	<u>27.64</u>
2.			
3.			

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 27.64

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 215.12 X 10% . . . . . \$ 21.51

D. Total Costs . . . . . \$ 236.63

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ 235

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3: - PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - ROAD CONSTRUCTION AND MAINTENANCE

Operations - Equipment Move-In - Front End (Bucket)

Loader

Reference for Cost Table ILLUSTRATION 4 TABLE 2

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>Front End Loader Cat. 950</u>		<u>RENTAL</u>	
<u>2 to 2½ C.Y. Capacity</u>		<u>3 x 26.60</u>	<u>79.80</u>
<u>3 hrs. machine Rate</u>			
2. <u>On Highway Trip Permit</u>			<u>8.00</u>
<u>DMV</u>			
3. _____			
4. _____			
5. _____			
6. _____			
Total Machine Rate . . . \$ <u>87.80</u>			

B. <u>Wage Rates</u> (Adjusted Hourly Rate)			
<u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>	
1. <u>Tractor Opr. (Large) (3hrs)</u>	<u>14.40</u>	<u>43.20</u>	
2. _____			
3. _____			



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 43.20

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 131.10 X 10% . . . . . \$ 13.10

D. Total Costs . . . . . \$ 144.10

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Costs

Total . . . . . \$ 145

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - ROAD CONSTRUCTION AND MAINTENANCEOperations - CLEARING - PER ACREReference for Cost Table ILLUSTRATION 4 TABLE 3

## I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> <u>Machine/Time</u>			
1.	<u>Yarding Tractor D7G</u> <u>Machine Rate 10.45 hrs</u> <u>Fixed Costs (Delay) 2.5 hrs.</u>	<u>12.95</u> <u>x 12.01</u>	<u>10.45</u> <u>x 13.82</u>	<u>299.93</u>
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
Total Machine Rate . . .		\$	<u>299.93</u>	

	B.	<u>Wage Rates</u> (Adjusted Hourly Rate) <u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
Operating	1.	<u>Tractor Oper. (Lge) (10.45 hrs)</u>	<u>14.40</u>	<u>150.48</u>
Manual	2.	<u>Tractor Oper. (Lge) (1.98 hrs)</u>	<u>14.40</u>	<u>28.51</u>
Labor	3.	<u>Chaser (10.58 hrs)</u>	<u>12.55</u>	<u>132.78</u>

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 311.77

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 611.70 X 10% . . . . . \$ 61.70

D. Total Costs . . . . . \$ 673.40

II Misc. Add'l. Costs/Adjustments

Time Per Acre (From Studies)

Tractor- D7F Working Time	627 Min.	10.45 Hrs.
Tractor- D7F Fixed (Delay) Time	150 "	2.5 "
Manual Labor- Chaser Time	635 "	10.58 "
Tractor Operator Time	119 "	1.98 "

III Operating Cost

Total . . . . . \$ 673/Acre

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost Computations

Activity - ROAD CONSTRUCTION AND MAINTENANCE  
 Operations - EXCAVATION & END HAUL W/WHEEL SCRAPER

Reference for Cost Table ILLUSTRATION 4 TABLE 10I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> <u>Machine/Time</u>			
1.	<u>Scraper-Rental Rate</u> <u>For 2 Wheel Scraper</u> <u>12 to 19 C.Y. Capacity</u>			<u>41.60</u>
2.	<u>Tractor Mounted Dozer D8K</u>	<u>17.25</u>	<u>19.91</u>	<u>37.16</u>
3.				
4.				
5.				
6.				
Total Machine Rate . . .		\$	<u>78.76</u>	

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.	<u>Wheel Scraper Opr.</u> <u>(Dozer Oper)</u>	<u>14.40</u>	<u>14.40</u>
2.	<u>Dozer Operator</u>	<u>14.40</u>	<u>14.40</u>
3.			



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 28.80

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ \_\_\_\_\_ X 10% . . . . . \$ \_\_\_\_\_

D. Total Costs . . . . . \$ \_\_\_\_\_

II Misc. Add'l. Costs/Adjustments

Adjustment-Machine Rate For Operating Efficiency

1/ Scraper-Actually Operating 35 % of Total Available Working Time or  
Delay of 65% of machine Rate  $41.60 \times .35 = 14.56$

2/ D8K Pusher-Operating 0.8 minutes Per Cycle Loading and an Estimated  
1.0 minute Per Cycle in General Work.  
Total- 1.8 Minutes Per Cycle.

III Operating Cost:

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 14.56 Wheel Scraper @ 35% Efficiency

Per Minute \$ \_\_\_\_\_

Remarks: 1/ Data From FHA (BPR) Time Studies Special Committee Report No 11

2/ Data From Caterpillar Performance Handbook

9353.3: - PRODUCTION COSTS  
SCHEDULE 20

### Operating Cost Computations

Activity - ROAD CONSTRUCTION AND MAINTENANCE

Operations - EXCAVATION WITH 3/4 C.Y. SHOVEL

Reference for Cost Table ILLUSTRATION 4 TABLE 11

## I Determining Hourly Cost

		Fixed	Operating	Total
A.	Machine Rates Machine/Time			
* 1.	3/4 C.Y. SHOVEL-RENTAL RATE \$25.80/HR 53% EFFICIENCY	53x	25.80	13.67
2.				
3.				
4.				
5.				
6.				
Total Machine Rate		...	\$	13.67

B.	<u>Wage Rates</u> (Adjusted Hourly Rate)	<u>Hour Rate</u>	<u>Total</u>
	<u>Crew Position/Time</u>		
1.	SHOVEL OPERATOR	14.05	14.05
2.	LABOR (HELPER)	12.23	12.23
3.			

SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 26.28

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 39.95 X 10% . . . . . \$ 4.00

D. Total Costs . . . . . \$ 49.95

II Misc. Add'l. Costs/Adjustments

\* Adjustment machine rate for operating efficiency actually  
operating at 53% of total available working time from data  
based on FHA TIME STUDIES.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Costs

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 43.95 @ 53% Efficiency

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Appendix 1, Page 237  
(C2d5)

Operating Cost Computations

Activity - ROAD CONSTRUCTION & MAINTENANCE

Operations - SHOVEL LOADING - BANK TO TRUCK

Reference for Cost Table ILLUSTRATION 4 TABLE 12

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> Machine/Time			
1.	<u>3/4 C.Y. Shovel Rental Rate</u> <u>25.80</u> <u>53% Efficiency</u>	<u>.53</u>	<u>25.80</u>	<u>13.67</u>
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
Total Machine Rate . . .		\$	<u>13.67</u>	

B.	<u>Wage Rates</u> (Adjusted Hourly Rate) Crew Position/Time	<u>Hour Rate</u>	<u>Total</u>
1.	<u>Shovel Operator</u>	<u>14.05</u>	<u>14.05</u>
2.	<u>Labor (Helper)</u>	<u>12.23</u>	<u>12.23</u>
3.	_____	_____	_____



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 26.28

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 39.75 X 10% . . . . . \$ 4.00

D. Total Costs . . . . . \$ 43.95

II Misc. Add'l. Costs/Adjustments

Machine rate for 53% efficiency. Hourly production  
@53% off. Adjusted from swell from bank cubic yards (in place)  
to loose cubic yards loaded in truck.

Bank CY/HR ÷ load factor - 50 CY/HR 0.60 = 83 CY/HR  
 $\frac{43.95}{83} = 0.53$  83 CY/HR = \$ 0.53/C.Y

III Operating Cost:

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 0.53 / CU. Yard \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Appendix 1, Page 239  
(C2d6)

Operating Cost Computations

Activity - ROAD CONSTRUCTION AND MAINTENANCE

Operations - GRADING PER STATION

Reference for Cost Table ILLUSTRATION 4 TABLE 18

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u>			
	<u>Machine/Time</u>			
1. #	Motor Grader Cat No 12F	$20.4 \text{ Min.}$ $\times \$ .074$	$11.8 \text{ Min.}$ $\times \$ .082$	2.46
	<u>Operating &amp; Delay Time 20.4 Min.</u>			
	<u>Operating Time. 11.8 min</u>			
2.	_____	_____	_____	_____
	_____			
	_____			
3.	_____	_____	_____	_____
	_____			
	_____			
4.	_____	_____	_____	_____
	_____			
	_____			
5.	_____	_____	_____	_____
	_____			
	_____			
6.	_____	_____	_____	_____
	_____			
	_____			
Total Machine Rate . . .		\$ 2.46		

B.	<u>Wage Rates</u> (Adjusted Hourly Rate)	<u>Min</u>	
	<u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1.	GRADER OPERATOR (20.4 Min.)	\$ 2.23	4.55
2.	_____	_____	_____
3.	_____	_____	_____

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 4.55

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 7.01 x 10% . . . . . \$ 0.70

D. Total Costs . . . . . \$ 7.71

II Misc. Add'l. Costs/Adjustments

\* Study Time Per Station (Minutes) - Based on Six BLM Time Studies

OPERATING 1559 Minutes/131.86 Stations = 11.8 min/Station

DELAY 1129 Minutes/131.86 Stations = 8.6 Min/Station

III Operating Cost:

Total . . . . . \$ 7.71 /STA

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

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(C2d7)

Operating Cost Computations

Activity - ROAD CONSTRUCTION AND MAINTENANCE

Operations - SURFACING - LOADING (FROM STOCKPILE)

Reference for Cost Table ILLUSTRATION 4 TABLE 19

I Determining Hourly Cost

	<u>Machine Rates</u>	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
	Machine/Time			
1.	<u>FRONT END (BUCKET) LOADER</u> <u>CAT 950 2 TO 2 1/2 CU. YD. CAP.</u> <u>RENTAL RATE</u>			<u>26.60</u>
2.				
3.				
4.				
5.				
6.				
Total Machine Rate . . . . \$				<u>26.60</u>

B. Wage Rates (Adjusted Hourly Rate)

	<u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1.	<u>TRACTOR (LOADER) OPERATOR</u>	<u>13.82</u>	<u>13.82</u>
2.			
3.			



## SCHEDULE 20

4. \_\_\_\_\_  
 5. \_\_\_\_\_  
 6. \_\_\_\_\_  
 7. \_\_\_\_\_  
 8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 13.82

C. General and Administrative Costs  
 10% of Machine and Wage Rates

\$ 40.42 X 10% . . . . . \$ 4.04

D. Total Costs . . . . . \$ 44.46

II Misc. Add'l. Costs/Adjustments

Adjusted to cost per cubic yard

Estimated hourly production--100 cubic yards

\$44.16/100 c.y. = \$0.44/c.y.

III Operating Costs

Total . . . . . \$ 0.44/c.y.

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

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(C2d8)

Operating Cost Computations

Activity - ROAD CONSTRUCTION & MAINTENANCE

Operations - SPREADING - COST PER STATION

Reference for Cost Table ILLUSTRATION 4 TABLE 17

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> Machine/Time			
1.	Motor Grader Cat No. 12G * Operating & Delay = 4.24 Min Operating 3.18 min	4.24	3.18	.553
2.				
3.				
4.				
5.				
6.				
Total Machine Rate . . .		\$	.553	

B.	<u>Wage Rates</u> (Adjusted Hourly Rate) Crew Position/Time	<u>Hour Rate</u>	<u>Total</u>
1.	Grader Operator (4.24 Min)	4.24 x .0023	.075
2.			
3.			

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 0.75

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 1.50 X 10% . . . . . \$ 0.15

D. Total Costs . . . . . \$ 1.65

II Misc. Add'l. Costs/Adjustments

\* Study Time Per Station (Minutes)

Motor grader estimated 7 passes @ 2.5 miles per hour for each 100' lift

of aggregate, or 700 linear feet of grade spreading for each 100' station

Total time - Operating was estimated @ 75% of total spreading time.

2.5 MPH = 200'/Min. 700'/200'/Min = 3.18 Min/Station

3.18 Min/Sta  $\div$  75% = 4.24 Min total time per station

III Operating Cost:

Total . . . . . \ \$1.65/Station

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Appendix 1, Page 245  
(C2d9)

Operating Cost Computations

Activity - ROAD CONSTRUCTION AND MAINTENANCE

Operations - ROLLING ROCK-VIBRATOR ROLLER W/CAT D6C

Reference for Cost Table ILLUSTRATION 4/ TABLE 19

I Determining Hourly Cost

A. <u>Machine Rates</u> Machine/Time	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
1. <u>Vibrator Roller 27 to 36 H.P.</u>			<u>14.70</u>
<u>Based on Rental Rate</u>			
2. <u>Towing Tractor Cat D6C</u>	<u>7.75</u>	<u>7.61</u>	<u>15.46</u>
<u>Machine Rate</u>			
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
Total Machine Rate . . .			\$ <u>30.17</u>

B. <u>Wage Rates</u> (Adjusted Hourly Rate) Crew Position/Time	<u>Hour Rate</u>	<u>Total</u>
1. <u>Tractor Oper. (Small)</u>	<u>13.82</u>	<u>13.82</u>
2. _____	_____	_____
3. _____	_____	_____



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 13.82

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 43.98 X 10% . . . . . \$ 4.40

D. Total Costs . . . . . \$ 48.38

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost:

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 48.38

Per Minute \$ 0.806

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - ROAD CONSTRUCTION & MAINTENANCEOperations - ROLLING ROCK - VIBRATOR ROLLER W/RUBBER TIRE TRACK LOADERReference for Cost Table ILLUSTRATION 4 TABLE 19

## I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> Machine/Time			
1.	<u>Vibrator Roller 27 to 36 H.P.</u> <u>Based on Rental Rate</u>			<u>14.70</u>
2.	<u>Towing Tractor-Rubber Tire</u> <u>Loader-Cat 950</u> <u>Based on Rental Rate</u>			<u>26.60</u>
3.				
4.				
5.				
6.				
Total Machine Rate . . . \$				<u>41.30</u>

B.	<u>Wage Rates</u> (Adjusted Hourly Rate) Crew Position/Time	<u>Hour Rate</u>	<u>Total</u>
1.	<u>Tractor-Operator (Small)</u>	<u>13.82</u>	<u>13.82</u>
2.			
3.			

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 13.82

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 55.12 X 10% . . . . . \$ 5.51

D. Total Costs . . . . . \$ 60.63

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 60.63

Per Minute \$ 1.01

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Appendix 1, Page 249  
(C2d9)

Operating Cost Computations

Activity - ROAD CONSTRUCTION & MAINTENANCE

Operations - ROLLING ROCK - GRID ROLLER W/TRACTOR D6C

Reference for Cost Table ILLUSTRATION # TABLE 19

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> <u>Machine/Time</u>			
1.	<u>Grid Roller-16 Tons</u> <u>Based on Rental Rate</u>			<u>9.30</u>
2.	<u>Towing Tractor-Cat D6C</u> <u>Machine Rate</u>	<u>7.85</u>	<u>7.61</u>	<u>15.46</u>
3.				
4.				
5.				
6.				
Total Machine Rate . . .		\$	<u>24.76</u>	

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.	<u>Tractor Operator-Small</u>	<u>13.82</u>	<u>13.82</u>
2.			
3.			



9353.3 - PRODUCTION COSTS  
SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 13.82

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ 35.58 X 10% . . . . . \$ 3.86

D. Total Costs . . . . . \$ 42.44

II Misc. Add'l. Costs/Adjustments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

III Operating Cost:

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ 42.44

Per Minute \$ .707

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

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(C2e1)

Operating Cost Computations

Activity - FIRE PROTECTION AND HAZARD REDUCTION

Operations - FIRE PROTECTION PORTABLE PUMP

Reference for Cost Table ILLUSTRATION 5 TABLE 1

I Determining Hourly Cost

		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A.	<u>Machine Rates</u> <u>Machine/Time</u>			
1.	<u>PORTABLE PUMP w/MOTOR</u> <u>EDWARDS MFG Co.</u> <u>MODEL TSD-25</u>			<u>872.00</u>
2.	<u>500 FT OF 1" HOSE @ \$7.91/FT</u>			<u>395.00</u>
3.	<u>FOG NOZZLE - EDWARDS STOP-</u> <u>O-MATIC SHUTOFF CONTROL</u> <u>(15 to 45 LBS. RANGE)</u>			<u>40.25</u>
4.	<u>1 1/2" x 10' SUCTION HOSE &amp;</u> <u>STRAINER</u>			<u>60.90</u>
5.				
6.				
Total Machine <sup>Cost</sup> Rate			\$	<u>1368.15</u>

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

		<u>Hour Rate</u>	<u>Total</u>
1.			
2.			
3.			

## SCHEDULE 20

4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ \_\_\_\_\_

- C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ \_\_\_\_\_ X 10% . . . . . \$ \_\_\_\_\_

- D. Total Costs . . . . . \$ \_\_\_\_\_

II Misc. Add'l. Costs/Adjustments

ADJUSTMENT \_\_\_\_\_

Equipment used 5 months @ 30 Days/Month = 150 Days \_\_\_\_\_

Depreciation period--5 years --1368.15/5 Yrs. = 273.63/Yr. \_\_\_\_\_

Cost per day = \$273.63 ÷ 150 Days = \$1.824/Day \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

III Operating Costs

Total . . . . . \$ 1.82/Day

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - FIRE PROTECTION AND HAZARD REDUCTIONOperations - FIRE PROTECTION TRACTOR MOUNTED PUMPReference for Cost Table ILLUSTRATION 5 TABLE 1

## I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
A. <u>Machine Rates</u> Machine/Time			
1. <u>TRAILER UNIT</u>			<u>902.00</u>
2. <u>PUMP EDWARDS MFG CO MODEL</u> <u>ST. 500 - 500 GAL TANK</u> <u>W/RELIEF VALVE, SUCTION HOSE</u> <u>STRAINER HOSE REEL, FOG</u> <u>NOZZLE, W/AUTO SHUT OFF</u> <u>VALVE 250' OF 1" HOSE, PUMP</u> <u>&amp; REEL COVERS</u>			<u>4211.00</u>
3. <u>ADDITIONAL 250' OF 1"</u> <u>HOSE @ .79/FT</u>			<u>179.50</u>
4. _____			
5. _____			
6. _____			
Total Machine <sup>Cost</sup> Rate . . .		\$	<u>5310.50</u>

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1. _____		
2. _____		
3. _____		



9353.3 - PRODUCTION COSTS

SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ \_\_\_\_\_

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ \_\_\_\_\_ X 10% . . . . . \$ \_\_\_\_\_

D. Total Costs . . . . . \$ \_\_\_\_\_

II Misc. Add'l. Costs/Adjustments

ADJUSTMENT

Equipment used 5 months @ 30 Days/Month = 150 Days

Depreciation period--5 years = \$5310.50/5 Yrs. = \$1062.10/Yr.

Cost per day = \$1062.10/150 Days = \$7.08/Day

III Operating Costs

Total . . . . . \$ 7.08/Day

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

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(C2e1)

Operating Cost Computations

Activity - PIPE PROTECTION AND HAZARD REDUCTION

Operations - FIRE PROTECTION- TRUCK MOUNTED PUMP

Reference for Cost Table ILLUSTRATION 5 TABLE 1

I Determining Hourly Cost

	<u>Machine Rates</u>	<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
	<u>Machine/Time</u>			
1.	<u>USED 1 1/2 TON TRUCK</u>	<u>      </u>	<u>      </u>	<u>3500</u>
2.	<u>SLIP ON UNIT-EDWARDS MFG CO</u> <u>MODEL ST 500-500 GAL TANK</u> <u>W/RELIEF VALVE SUCTION HOSE</u>	<u>      </u>	<u>      </u>	<u>4211.00</u>
3.	<u>STRAINER HOSE REEL FOG NOZZLE</u> <u>W/AUTO SHUT OFF VALVE 250'</u> <u>OF 1" HOSE, PUMP &amp; REEL COVERS</u>	<u>      </u>	<u>      </u>	<u>      </u>
4.	<u>ADDITIONAL 250 FT OF</u> <u>1" HOSE @ \$.79/FT</u>	<u>      </u>	<u>      </u>	<u>197.50</u>
5.	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>
6.	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>
Total Machine <sup>Cost</sup> Rate		<u>      </u>	<u>\$</u>	<u>7908.50</u>

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1.	<u>      </u>	<u>      </u>
2.	<u>      </u>	<u>      </u>
3.	<u>      </u>	<u>      </u>

9353.3 - PRODUCTION COSTS

SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ \_\_\_\_\_

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ \_\_\_\_\_ X 10% . . . . . \$ \_\_\_\_\_

D. Total Costs . . . . . \$ \_\_\_\_\_

II Misc. Add'l. Costs/Adjustments

ADJUSTMENT

Equipment used 5 months @ 30 Days/Month = 150 Days

Depreciation period - 5 Yrs. - \$7908.50/5Yrs. = 1581.70/Yr.

Cost per day--\$1581.70/150 Days= \$10.544/Day

III Operating Costs

Total . . . . . \$ 10.54/Day

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - FIRE PROTECTION AND HAZARD REDUCTIONOperations - FIRE PROTECTION ASSOCIATED FIRE EQUIPMENTReference for Cost Table ILLUSTRATION 5 TABLE 1

## I Determining Hourly Cost

	Fixed	Operating	Total
A. <u>Machine Rates</u> Machine/Time			
1. <u>PSYCHROMETER</u>			<sup>\$</sup> 16.45
2. <u>4 HAZEL HOES @ 16.87 EA = 67.48</u> <u>3 FIRE AXES @ 13.41 EA = 40.23</u> <u>3 SHOVELS @ 11.05 EA = 33.15</u>			140.86
3. <u>4 BACK PUMPS @ 61.00 EA</u>			244.00
4. <u>10 HEADLIGHTS (FOR MEN) @ 8.96 EA</u>			89.60
5. <u>2 SETS TRACTOR HEADLIGHTS @ 325 / SET</u>			650.00
6. <u>METAL FIRE BOX 12'x12'x5' w/locks</u>			145.00
Total Machine <sup>Cost</sup> Rate . . . .	\$		1295.81

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	Hour Rate	Total
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____



9353.3 - PRODUCTION COSTS

SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ \_\_\_\_\_

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ \_\_\_\_\_ X 10% . . . . . \$ \_\_\_\_\_

D. Total Costs . . . . . \$ \_\_\_\_\_

II Misc. Add'l. Costs/Adjustments

ADJUSTMENT

Equipment used 5 months @ 30 Days/Month = 150 Days

Depreciation period 5 years = \$1295.81/5 Yrs. = \$259.16/Yr.

Cost per day \$259.16/150 Days = \$1.727/Day

III Operating Costs

Total . . . . . \$ 1.73/day

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20Operating Cost ComputationsActivity - FIRE PROTECTION AND HAZARD REDUCTIONOperations - FIRE PROTECTION PORTABLE PUMP-COST BY SALE SIZEReference for Cost Table ILLUSTRATION 5 TABLE 1

## I Determining Hourly Cost

A. <u>Machine Rates</u> <u>Machine/Time</u>	<u>Fixed</u>	<u>Operating</u>	<u>Total</u> <u>/Day</u>
1. <u>PORTABLE PUMP ETC</u>	<u>      </u>	<u>      </u>	<u>1.82</u>
2. <u>ASSOCIATED FIRE EQUIP</u>	<u>      </u>	<u>      </u>	<u>1.73</u>
3. <u>                                  </u>	<u>      </u>	<u>      </u>	<u>      </u>
4. <u>                                  </u>	<u>      </u>	<u>      </u>	<u>      </u>
5. <u>                                  </u>	<u>      </u>	<u>      </u>	<u>      </u>
6. <u>                                  </u>	<u>      </u>	<u>      </u>	<u>      </u>
Total Machine <sup>Cost</sup> Rate . . . \$ <u>3.55</u>			

B. <u>Wage Rates</u> (Adjusted Hourly Rate) <u>Crew Position/Time</u>	<u>Hour Rate</u>	<u>Total</u>
1. <u>LABOR (1 Hour/DAY)</u>	<u>1.12</u>	<u>1.12</u>
2. <u>                                  </u>	<u>      </u>	<u>      </u>
3. <u>                                  </u>	<u>      </u>	<u>      </u>

## SCHEDULE 20

4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 11.12

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ \_\_\_\_\_ X 10% . . . . . \$ \_\_\_\_\_

D. Total Costs . . . . . \$ \_\_\_\_\_

II Misc. Add'l. Costs/Adjustments

ADJUSTMENT FOR SALE SIZE

	Up to 3MM	3MM To 8MM	8MM & Larger
EQUIPMENT	\$3.55	\$3.55	\$568 (8 Mos)
WAGES	\$11.12	890 (4 Mos.)	\$1779 (8 Mos)
DAYS OF PRODUCTION	60 Days	-----	
PRODUCTION PER DAY	-----	50M/Day	
COST PER M	\$880/3MM	\$0.07 1/2	
TOTAL COST	\$0.29/M	\$890 + \$0.07/M	\$2347.00

III Operating Costs

1/2 Equipment Only  
Month = 20 Working Days

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

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(C2e2)

Operating Cost Computations

Activity - FIRE PROTECTION AND HAZARD REDUCTION

Operations - FIRE PROTECTION TRAILER MOUNTED PUMP

COST BY SALE SIZE

Reference for Cost Table ILLUSTRATION 5 TABLE 1

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u> /DAY
A. <u>Machine Rates</u> Machine/Time			
1. <u>TRAILER MOUNTED PUMP</u> <u>COMPLETE</u>			<u>7.08</u>
2. <u>ASSOCIATED FIRE EQUIP</u>			<u>1.73</u>
3. _____			
4. _____			
5. _____			
6. _____			
Total Machine Rate . . . \$			<u>8.81/DAY</u>

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1. <u>LABOR (1 HR DAY)</u>	<u>11.12</u>	<u>11.12</u>
2. _____		
3. _____		



9353.3 - PRODUCTION COSTS

SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 11.12

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ \_\_\_\_\_ X 10% . . . . . \$ \_\_\_\_\_

D. Total Costs . . . . . \$ 19.93

II Misc. Add'l. Costs/Adjustments

ADJUSTMENT FOR SALE SIZE

	UP TO 3MM	3MM To 8MM	8MM & Larger
EQUIPMENT	\$8.81/Day	\$8.81/Day	\$1410 (8 Mos)
WAGES	\$11.12/Day	\$890/4 Mos.	\$1779 (8 Mos)
DAYS OF PRODUCTION	60 Days		
PRODUCTION PER DAY		50M/Day	
COST PER M	\$1195.80/3MM	\$0.18 1/2	
TOTAL COST	\$0.40/M	\$890 + 0.18/M	\$3189

III Operating Costs

1) Equipment Only  
Month = 20 Working Days

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ \_\_\_\_\_

Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
SCHEDULE 20

Operating Cost Computations

Activity - FIRE PROTECTION AND HAZARD REDUCTION

Operations - FIRE PROTECTION TRUCK MOUNTED PUMP

COST BY SALE SIZE

Reference for Cost Table ILLUSTRATION 5 TABLE 1

I Determining Hourly Cost

	<u>Fixed</u>	<u>Operating</u>	<u>Total</u> / Day
A. <u>Machine Rates</u> <u>Machine/Time</u>			
1. <u>TRUCK MOUNTED PUMP</u> <u>COMPLETE</u>			\$ 10.54
2. <u>ASSOCIATED FIRE EQUIPMENT</u>			173
3. _____			
4. _____			
5. _____			
6. _____			
Total Machine Rate . . .			\$ 12.27

B. Wage Rates (Adjusted Hourly Rate)  
Crew Position/Time

	<u>Hour Rate</u>	<u>Total</u>
1. <u>LABOR (1-HOUR/DAY)</u>	11.12	11.12
2. _____		
3. _____		

9353.3 - PRODUCTION COSTS

SCHEDULE 20

4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_  
7. \_\_\_\_\_  
8. \_\_\_\_\_

Total Wage Rate . . . . . \$ 11.12

C. General and Administrative Costs  
10% of Machine and Wage Rates

\$ \_\_\_\_\_ X 10% . . . . . \$ \_\_\_\_\_

D. Total Costs . . . . . \$ \_\_\_\_\_

II Misc. Add'l. Costs/Adjustments

ADJUSTMENT FOR SALE SIZE

	Up to 3MM	3MM to 8MM	8MM & Larger
EQUIPMENT	\$12.27/Day	\$12.27/DAY	\$1963.30 (8 Mos.)
WAGES	11.12/Day	\$890(4Mos.)	\$1779.20 (8 Mos.)
DAYS OF PRODUCTION	60 Days		-----
PRODUCTION PER DAY		50M/Day	-----
COST PER M	1402/3MM	\$0.24 1/2	-----
TOTAL COST	0.47/M	\$890 + \$0.24	\$3742

III Operating Costs      1/2 Equipment Only  
Month= 20 Working Days

Total . . . . . \$ \_\_\_\_\_

Per Hour \$ \_\_\_\_\_

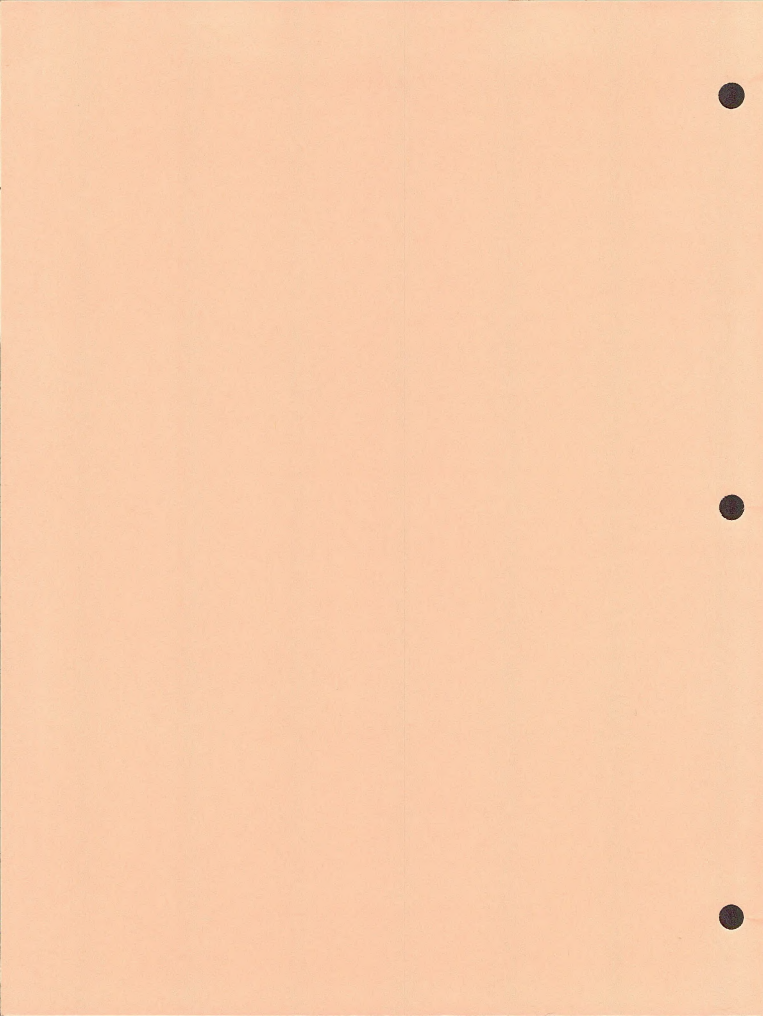
Per Minute \$ \_\_\_\_\_

Remarks:

9353.3 - PRODUCTION COSTS  
(Schedule 20)

3. Cost and Production Studies. Summaries of individual time and motion studies are recorded in the following tables. In some cases, regression equations for the particular studies are included. Not all BLM logging cost studies nor all components of the included studies have been recorded in this appendix. Only major studies with specific operational times are included. This data is grouped by major functions and referenced to specific cost tables in the schedule.





9353.3 - PRODUCTION COSTS  
(Schedule 20)  
Cost And Production Studies

Activity - Falling & Bucking

Operations - Merchantable Trees - Western Oregon

Reference for Cost Table Illustration 1, Table 1

Falling and Bucking Operating Time - Minutes per MBF Gross  
Volume 1/2/

No. of 16' Logs	Per cent Top Loss										
	0	5	10	15	20	25	30	35	40	45	50
1	46.45	45.98	45.49	45.01	44.52	44.03	43.55	43.06	42.59	42.10	41.61
2	38.00	37.51	37.03	36.55	36.06	35.57	35.10	34.61	34.13	33.64	33.15
3	30.67	30.18	29.71	29.22	28.73	28.25	27.76	27.27	26.80	26.31	25.83
4	24.46	23.98	23.49	23.00	22.53	22.04	21.56	21.07	20.58	20.10	19.61
5	19.38	18.89	18.41	17.92	17.44	16.95	16.46	15.99	15.50	15.01	14.53
6	15.41	14.91	14.45	13.96	13.47	12.99	12.50	12.03	11.54	11.06	10.57
7	12.57	12.08	11.61	11.12	10.64	10.15	9.66	9.18	8.69	8.22	7.73
8	10.85	10.37	9.88	9.41	8.92	8.43	7.95	7.46	6.99	6.50	6.01
9	10.26	9.77	9.30	8.81	8.33	7.84	7.35	6.87	6.38	5.91	5.42

1/ Regression equation:

$$Y = 33.1054 - 7.2427X_1 + .0692X_2 - .0306X_3 - .4011X_4$$

Y = Falling and bucking time per MBF gross volume

X<sub>1</sub> = Number of 16' logs

X<sub>2</sub> = Recovery per cent  $\frac{(\text{Gross volume} - \text{Top loss})}{\text{Gross Volume}}$

X<sub>3</sub> = Number of stems per acre

X<sub>4</sub> = Number of 16' logs squared

2/ Miscellaneous delay time of 40% is included in table.

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
Cost And Production Studies

Activity - Falling & Bucking

Operations - Unmerchantable Snags and Culls - Western & Eastern Oregon

Reference for Cost Table Illustration 1, Table 3 & Table 4

Operating Time - Time per Stem for Falling Unmerchantable Snags  
and Green Culls

<u>D.B.H.</u>	<u>Time per Stem <sup>1/</sup></u>
8	2.62
12	4.38
16	6.14
20	7.90
24	9.66
28	11.42
32	13.18
36	14.94
40	16.70
44	18.46
48	20.22
52	21.98
56	23.74
60	25.50
64	27.26
68	29.02
72	30.78
76	32.54
80	34.30
84	36.06
88	37.82
92	39.58
96	41.34
100	43.10

<sup>1/</sup> Equation:  $Y = .44X - .90$   
Y = Time per stem in minutes  
X = D.b.h. in inches

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
Cost And Production Studies

Activity - Falling & Bucking

Operations - Commercial Thinnings - Western Oregon

Reference for Cost Table Illustration 1, Table 5

Falling and Bucking Operating Time - Minutes per tree

(a) Development of Time Components (from PNW-41)

Walking to tree; regression equation:

$$Y_1 = 2.332 - 0.01033T_1 + 0.0000182(T_1)^2 - 0.01235T_3$$

Where:

$Y_1$  = Time per tree in minutes

$T_1$  = Number of trees per acre before cut

$T_3$  = Number of trees cut per acre

For BLM thinning sale conditions,  $T_1$  average is 170,  
 $T_3$  average is 51 and  $Y_1 = 0.472$  minute (use as a  
constant).

Swamping (clearing away of interfering brush and branches):  
Regression produced a low coefficient of determination.  
Therefore, the simple mean was used as a constant (PNW-41).

$$Y_2 = 0.21 \text{ minute per tree}$$

Falling, limbing and bucking; regression equation:

$$Y_3 = 1.3805 + 0.01134H^2 + 1.179B$$

Where:

$Y_3$  = Time per tree in minutes

$H$  = DBH in inches

$B$  = Number of bucking cuts after falling (It is  
assumed here that a 32-foot log is standard)

Summation equation:

$$Y_4 = Y_1 + Y_2 + Y_3$$

$$= 0.472 + 0.21 + 1.3805 + 0.1134H^2 + 1.179B, \text{ or}$$

$$Y_4 = 2.0625 + 0.1134H^2 + 1.179B$$



9353.3 - PRODUCTION COSTS  
(Schedule 20)  
Cost And Production Studies

Computed Operating Time - Minutes per Tree

D.B.H. Inches	Number of 32-Foot Logs per Tree <sup>1/</sup>					
	1	2	3	4	5	6
8	3.968	5.146				
10	4.376	5.555	6.734			
12	4.875	6.054	7.233			
14	5.465	6.644	7.822	9.001		
16	6.145	7.324	8.503	9.682		
18	6.916	8.095	9.274	10.453		
20	7.778	8.957	10.136	11.315	12.494	
22	8.731	9.910	11.089	12.268	13.446	
24	9.674	10.853	12.032	13.211	14.489	15.668
26	10.908	12.087	13.266	14.445	15.624	16.802
28	12.133	13.312	14.491	15.670	16.849	18.027
30	13.448	14.627	15.806	16.985	18.164	19.343

Falling and Bucking Costs per Tree

These are the products of the adjusted falling and bucking costs per minute and minutes of operating time per tree.

<sup>1/</sup> The variable here is actually the number of bucking cuts after falling, with a 32-foot log as standard.

Activity - Rigging, Yarding and Loading - Western Oregon  
Operations - Tractor Yarding  
Cost and Production Studies

Reference for Cost Table Illustration 2, Table 3 and 4, 5, 6, 7, 8, 9, 10, 11

(1) Operating Time for Tractor Yarding in Western Oregon - Minutes per MBF Gross Volume Yarded 1/ 2/ 4/																				
16 Ft. Log Volume Scrib. Dec.C.	Yarding Distance in Feet 3/																			
	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
10	24.71	24.95	25.20	25.44	25.69	25.93	26.18	26.42	26.67	26.91	27.16	27.40	27.65	27.90	28.15	28.38	28.63	28.87	29.12	29.36
12	20.47	20.71	20.96	21.20	21.45	21.69	21.94	22.18	22.43	22.67	22.92	23.16	23.41	23.65	23.90	24.14	24.39	24.63	24.88	25.12
14	17.01	17.25	17.50	17.74	17.99	18.23	18.48	18.72	18.97	19.21	19.46	19.70	19.95	20.19	20.44	20.68	20.93	21.17	21.42	21.66
16	14.18	14.43	14.67	14.92	15.16	15.41	15.65	15.90	16.14	16.39	16.63	16.88	17.12	17.37	17.61	17.86	18.10	18.35	18.59	18.84
18	11.88	12.13	12.37	12.62	12.86	13.11	13.35	13.60	13.84	14.09	14.33	14.58	14.82	15.07	15.31	15.56	15.80	16.05	16.29	16.54
20	10.01	10.26	10.50	10.75	10.99	11.24	11.48	11.73	11.97	12.22	12.46	12.71	12.95	13.20	13.44	13.69	13.93	14.18	14.42	14.67
22	8.49	8.73	8.98	9.22	9.47	9.71	9.96	10.20	10.45	10.69	10.94	11.18	11.43	11.67	11.92	12.16	12.41	12.65	12.90	13.14
24	7.25	7.50	7.74	7.99	8.23	8.48	8.72	8.97	9.21	9.46	9.70	9.95	10.19	10.44	10.68	10.93	11.17	11.42	11.66	11.91
26	6.25	6.50	6.74	6.99	7.23	7.48	7.72	7.97	8.21	8.46	8.70	8.95	9.19	9.44	9.68	9.93	10.17	10.42	10.66	10.91
28	5.44	5.69	5.93	6.18	6.42	6.67	6.91	7.16	7.40	7.65	7.89	8.14	8.38	8.63	8.87	9.12	9.36	9.61	9.85	10.10
30	4.79	5.04	5.28	5.53	5.77	6.02	6.26	6.51	6.75	7.00	7.24	7.49	7.73	7.98	8.22	8.47	8.71	8.96	9.20	9.45
32	4.27	4.51	4.76	5.00	5.25	5.49	5.74	5.98	6.23	6.47	6.72	6.96	7.21	7.45	7.70	7.94	8.19	8.43	8.68	8.92
34	3.85	4.10	4.34	4.59	4.83	5.08	5.32	5.57	5.81	6.06	6.30	6.55	6.79	7.04	7.28	7.53	7.77	8.02	8.26	8.51
36	3.52	3.77	4.01	4.26	4.50	4.75	4.99	5.24	5.48	5.73	5.97	6.22	6.46	6.71	6.95	7.20	7.44	7.69	7.93	8.18
38	3.26	3.51	3.75	4.00	4.24	4.49	4.73	4.98	5.22	5.47	5.71	5.96	6.20	6.45	6.69	6.94	7.18	7.43	7.67	7.92
40	3.06	3.30	3.55	3.79	4.04	4.28	4.53	4.77	5.02	5.26	5.51	5.75	6.00	6.24	6.49	6.73	6.98	7.22	7.47	7.71
42	2.91	3.15	3.40	3.65	3.89	4.13	4.38	4.62	4.87	5.11	5.36	5.60	5.85	6.09	6.34	6.58	6.83	7.07	7.32	7.56
46	2.71	2.95	3.20	3.44	3.69	3.93	4.18	4.42	4.67	4.91	5.16	5.40	5.65	5.89	6.14	6.38	6.63	6.87	7.12	7.36
52	2.59	2.84	3.08	3.33	3.57	3.82	4.06	4.31	4.55	4.80	5.04	5.29	5.53	5.78	6.02	6.27	6.51	6.76	7.00	7.25
66	2.74	2.99	3.23	3.48	3.72	3.97	4.21	4.46	4.70	4.95	5.19	5.44	5.68	5.93	6.17	6.42	6.66	6.91	7.15	7.40
72	2.88	3.13	3.37	3.62	3.86	4.11	4.35	4.60	4.84	5.09	5.33	5.58	5.82	6.07	6.31	6.56	6.80	7.05	7.29	7.54
78	3.04	3.28	3.53	3.77	4.02	4.26	4.51	4.75	5.00	5.24	5.49	5.73	5.98	6.22	6.47	6.71	6.96	7.20	7.45	7.69
84	3.21	3.45	3.70	3.94	4.19	4.43	4.68	4.92	5.17	5.41	5.66	5.90	6.15	6.39	6.64	6.88	7.13	7.37	7.62	7.86
90	3.38	3.62	3.87	4.11	4.36	4.60	4.85	5.09	5.34	5.58	5.83	6.07	6.32	6.56	6.81	7.05	7.30	7.54	7.79	8.03
96	3.55	3.80	4.04	4.29	4.53	4.78	5.02	5.27	5.51	5.76	6.00	6.25	6.49	6.74	6.98	7.23	7.47	7.72	7.96	8.21
100	3.67	3.92	4.16	4.41	4.65	4.90	5.14	5.39	5.63	5.88	6.12	6.37	6.61	6.86	7.10	7.35	7.59	7.84	8.08	8.33

1/ Regression equation:

$$Y = \text{Time in minutes per MBF } 16' \text{ logs}$$

$$Y = (.3148 + .0035X_1 + .0213X_2 + 46.0659X_3) \times 1.40$$

X<sub>1</sub> = Yarding distance in feet

X<sub>2</sub> = Scribner Dec. C log volume in 16 foot log

X<sub>3</sub> = e<sup>-1</sup> volume per log, where e is the base of natural logarithms and is equal to 2.7182818+.

2/ Delay and supplemental time of 40% is included in table.

3/ Distance logs actually travel from choker setting point to the landing.

4/ Times are for production of one tractor. As the cost per minute for the tractor operation is based on two tractors, the cost shown under 9a, is halved before multiplying by times.

Appendix 1 Page 110

9353.3 - PRODUCTION COSTS

(Schedule 20)

Cost and Production Studies

Range of Conditions on Study Areas

- |                              |                              |
|------------------------------|------------------------------|
| (1) Slope                    | - 45% downhill to 45% uphill |
| (2) Stems per acre           | - 23 to 100                  |
| (3) Yarding distance         | - 50 to 1490 feet            |
| (4) Logs per turn            | - 1 to 7                     |
| (5) Volume per log           | - 72 to 1306                 |
| (6) Number of tractors       | - 1 to 3 per side            |
| (7) Number of choker setters | - 1 or 2 per tractor         |



Activity - Rigging, Yarding and Loading - Western Oregon  
 Operations - Tractor Yarding - Partial Cut  
 Reference for Cost Table Illustration 2, Tables 6 and 7, 8/12/13/14/15/16/17

Operating Time for Partial Cut Tractor Yarding Operations in - Minutes per MBF Gross Volume Yarded <u>1/2</u> Western Oregon																				
16 Ft Log Volume Scrib. Dec. C	Yarding Distance in Feet <u>3/</u>																			
	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
6	51.92	52.38	52.84	53.30	53.76	54.22	54.67	55.13	55.59	56.05	56.51	56.97	57.43	57.89	58.35	58.81	59.28	59.72	60.18	60.64
8	44.20	44.66	45.12	45.58	46.04	46.50	46.96	47.41	47.87	48.33	48.79	49.25	49.71	50.17	50.63	51.09	51.55	52.01	52.46	52.92
10	37.84	38.30	38.76	39.22	39.67	40.13	40.59	41.05	41.51	41.97	42.43	42.89	43.35	43.81	44.26	44.72	45.18	45.64	46.10	46.56
12	32.58	33.04	33.50	33.96	34.42	34.88	35.34	35.80	36.26	36.71	37.17	37.63	38.09	38.55	39.01	39.47	39.93	40.39	40.85	41.30
14	28.24	28.70	29.15	29.61	30.07	30.53	30.99	31.45	31.91	32.37	32.83	33.29	33.75	34.20	34.66	35.12	35.58	36.04	36.50	36.96
16	24.63	25.09	25.55	26.01	26.47	26.93	27.39	27.85	28.31	28.77	29.22	29.68	30.14	30.60	31.06	31.52	31.98	32.44	32.90	33.36
18	21.64	22.10	22.56	23.02	23.48	23.93	24.39	24.85	25.31	25.77	26.23	26.69	27.15	27.61	28.07	28.53	28.99	29.44	29.90	30.36
20	19.14	19.60	20.06	20.52	20.98	21.44	21.90	22.36	22.82	23.28	23.73	24.19	24.65	25.11	25.57	26.03	26.49	26.95	27.41	27.87
22	17.06	17.52	17.97	18.43	18.89	19.35	19.81	20.27	20.73	21.19	21.65	22.11	22.56	23.02	23.48	23.94	24.40	24.86	25.32	25.78
24	15.30	15.76	16.22	16.68	17.14	17.60	18.06	18.52	18.97	19.43	19.89	20.35	20.81	21.27	21.73	22.19	22.65	23.11	23.56	24.02
26	13.82	14.28	14.74	15.20	15.66	16.12	16.58	17.04	17.49	17.95	18.41	18.87	19.33	19.79	20.25	20.71	21.17	21.63	22.08	22.54
28	12.57	13.02	13.48	13.94	14.40	14.86	15.32	15.78	16.24	16.70	17.16	17.62	18.07	18.53	18.99	19.45	19.91	20.37	20.83	21.29
30	11.49	11.95	12.41	12.87	13.33	13.79	14.25	14.71	15.17	15.62	16.08	16.54	17.00	17.46	17.92	18.38	18.84	19.30	19.76	20.21
32	10.57	11.03	11.49	11.95	12.41	12.87	13.32	13.78	14.24	14.70	15.16	15.62	16.08	16.54	17.00	17.46	17.91	18.37	18.83	19.29
34	9.77	10.23	10.69	11.15	11.61	12.07	12.52	12.98	13.44	13.90	14.36	14.82	15.28	15.74	16.20	16.66	17.11	17.57	18.03	18.49
36	9.07	9.53	9.99	10.45	10.91	11.37	11.82	12.28	12.74	13.20	13.66	14.12	14.58	15.04	15.50	15.96	16.42	16.87	17.33	17.79
38	8.45	8.91	9.37	9.83	10.29	10.75	11.21	11.67	12.13	12.59	13.04	13.50	13.96	14.42	14.88	15.34	15.80	16.26	16.72	17.18
40	7.90	8.36	8.82	9.28	9.74	10.20	10.66	11.12	11.58	12.04	12.49	12.95	13.41	13.87	14.33	14.79	15.25	15.71	16.17	16.63
42	7.41	7.87	8.33	8.79	9.25	9.71	10.16	10.62	11.08	11.54	12.00	12.46	12.92	13.38	13.84	14.30	14.75	15.21	15.67	16.13
44	6.96	7.42	7.88	8.34	8.80	9.26	9.72	10.17	10.63	11.09	11.55	12.01	12.47	12.93	13.39	13.85	14.31	14.76	15.22	15.68
46	6.55	7.01	7.47	7.93	8.39	8.84	9.30	9.76	10.22	10.68	11.14	11.60	12.06	12.52	12.98	13.43	13.89	14.35	14.81	15.27
48	6.17	6.63	7.09	7.54	8.00	8.46	8.92	9.38	9.84	10.30	10.76	11.22	11.68	12.13	12.59	13.05	13.51	13.97	14.43	14.89
50	5.81	6.27	6.73	7.19	7.65	8.11	8.56	9.02	9.48	9.94	10.40	10.86	11.32	11.78	12.24	12.70	13.16	13.61	14.07	14.53
52	5.47	5.93	6.39	6.85	7.31	7.77	8.23	8.69	9.15	9.61	10.06	10.52	10.98	11.44	11.90	12.36	12.82	13.28	13.74	14.20
54	5.15	5.61	6.07	6.53	6.99	7.45	7.91	8.37	8.83	9.29	9.74	10.20	10.66	11.12	11.58	12.04	12.50	12.96	13.42	13.88
56	4.85	5.31	5.77	6.22	6.68	7.14	7.60	8.06	8.52	8.98	9.44	9.90	10.36	10.82	11.27	11.73	12.19	12.65	13.11	13.57
58	4.55	5.01	5.47	5.93	6.39	6.85	7.31	7.77	8.22	8.68	9.14	9.60	10.06	10.52	10.98	11.44	11.90	12.36	12.82	13.27
60	4.27	4.73	5.18	5.64	6.10	6.56	7.02	7.48	7.94	8.40	8.86	9.32	9.77	10.23	10.69	11.15	11.61	12.07	12.53	12.99
62	3.99	4.45	4.91	5.37	5.82	6.28	6.74	7.20	7.66	8.12	8.58	9.04	9.50	9.96	10.41	10.87	11.33	11.79	12.25	12.71
64	3.72	4.17	4.63	5.09	5.55	6.01	6.47	6.93	7.39	7.85	8.31	8.76	9.22	9.68	10.14	10.60	11.06	11.52	11.98	12.44
66	3.45	3.91	4.37	4.83	5.28	5.74	6.20	6.66	7.12	7.58	8.04	8.50	8.96	9.42	9.87	10.33	10.79	11.25	11.71	12.17
68	3.18	3.64	4.10	4.56	5.02	5.48	5.94	6.40	6.86	7.32	7.78	8.23	8.69	9.15	9.61	10.07	10.53	10.99	11.45	11.91
70	2.92	3.38	3.84	4.30	4.76	5.22	5.68	6.14	6.60	7.06	7.52	7.97	8.43	8.89	9.35	9.81	10.27	10.73	11.19	11.65

For footnotes 1/, 2/, and 3/, and 6 - see next page.



Percent Slope 5/	Number of Merchantable Stems Marked Per Acre 4/													
	5	6	7	8	9	10	11	12	13	14	15	16	17	18
0	-1.30	-1.56	-1.83	-2.09	-2.35	-2.61	-2.87	-3.13	-3.39	-3.65	-3.91	-4.17	-4.43	-4.69
5	-0.57	-0.83	-1.09	-1.35	-1.61	-1.87	-2.14	-2.40	-2.66	-2.92	-3.18	-3.44	-3.70	-3.96
10	0.16	-0.10	-0.36	-0.62	-0.88	-1.14	-1.40	-1.66	-1.92	-2.18	-2.44	-2.71	-2.97	-3.23
15	0.90	0.64	0.38	0.11	-0.15	-0.41	-0.67	-0.93	-1.19	-1.45	-1.71	-1.97	-2.23	-2.49
20	1.63	1.37	1.11	0.85	0.59	0.33	0.07	-0.19	-0.46	-0.72	-0.98	-1.24	-1.50	-1.76
25	2.37	2.10	1.84	1.58	1.32	1.06	0.80	0.54	0.28	0.02	-0.24	-0.50	-0.76	-1.03
30	3.10	2.84	2.58	2.32	2.06	1.79	1.53	1.27	1.01	0.75	0.49	0.23	-0.03	-0.29
35	3.83	3.57	3.31	3.05	2.79	2.53	2.27	2.01	1.75	1.49	1.22	0.96	0.70	0.44
40	4.57	4.31	4.05	3.78	3.52	3.26	3.00	2.74	2.48	2.22	1.96	1.70	1.44	1.18
45	5.30	5.04	4.78	4.52	4.26	4.00	3.74	3.47	3.21	2.95	2.69	2.43	2.17	1.91
50	6.03	5.77	5.51	5.25	4.99	4.73	4.47	4.21	3.95	3.69	3.43	3.17	2.90	2.64
55	6.77	6.51	6.25	5.99	5.73	5.46	5.20	4.94	4.68	4.42	4.16	3.90	3.64	3.38
60	7.50	7.24	6.98	6.72	6.46	6.20	5.94	5.68	5.42	5.15	4.89	4.63	4.37	4.11

## 1/ Regression equation:

Y = Yarding time in minutes per MBF Scribner Decimal C. volume. \*

Y =  $(9.3167 - 0.1040X_1 + 63.8283X_2 + 0.0078X_3) \times 1.177$  $X_1$  = Scribner Decimal C volume per 16-foot log $X_2$  =  $e^{-.1X_1}$ , where e is the base of natural logarithms and is equal to 2.7183 $X_3$  = Yarding distance (straight line, slope distance)

## 2/ Delay and supplemental time of 17.7% is included in the table.

## 3/ Yarding distance is the average straight line slope distance from choker setting point to the landing. Do not add a factor for weave.

## 4/ Marked Stems - This is the number of merchantable stems marked per acre within the yarding area

## 5/ Slope - This is the average slope in per cent of the area being logged as estimated by the cruiser.

## 6/ Times are for production of one tractor. Costs applied must be on the same base.

Loading Times. The operating times used to develop tractor loading tables are the same as the operating times for partial cut tractor yarding, as the loading production is limited to the production of the yarding operation.

Activity - Raising, Yarding and Loading - Eastern Oregon  
Operations - Tractor Yarding

Reference for Cost Table

Illustration 2, Tables 19 and 20, 22, 23

(3) Operating Time for Tractor Yarding in Eastern Oregon - Minutes per MBF 1/ 2/ 5/

16' Ft. Log 4/ Volume Scrib. Dec.C.	Yarding Distance in Feet 3/																			
	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
4	19.29	19.51	19.73	19.95	20.17	20.39	20.61	20.83	21.05	21.27	21.49	21.71	21.93	22.15	22.37	22.59	22.81	23.03	23.25	23.47
6	18.29	18.51	18.73	18.95	19.17	19.39	19.61	19.83	20.05	20.27	20.49	20.71	20.93	21.15	21.37	21.59	21.81	22.03	22.25	22.47
8	17.32	17.54	17.76	17.98	18.20	18.42	18.64	18.86	19.08	19.30	19.52	19.74	19.96	20.18	20.40	20.62	20.84	21.06	21.28	21.50
10	16.37	16.59	16.81	17.03	17.25	17.47	17.69	17.91	18.13	18.35	18.57	18.79	19.01	19.23	19.45	19.67	19.89	20.11	20.33	20.55
12	15.45	15.67	15.89	16.11	16.33	16.55	16.77	16.99	17.21	17.43	17.65	17.87	18.09	18.31	18.53	18.75	18.97	19.19	19.41	19.63
14	14.55	14.77	14.99	15.21	15.43	15.65	15.87	16.09	16.31	16.53	16.75	16.97	17.19	17.41	17.63	17.85	18.07	18.29	18.51	18.73
16	13.67	13.89	14.11	14.33	14.55	14.77	14.99	15.21	15.43	15.65	15.87	16.09	16.31	16.53	16.75	16.97	17.19	17.41	17.63	17.85
18	12.83	13.05	13.27	13.49	13.71	13.93	14.15	14.37	14.59	14.81	15.03	15.25	15.47	15.69	15.91	16.13	16.35	16.57	16.79	17.01
20	12.00	12.22	12.44	12.66	12.88	13.10	13.32	13.54	13.76	13.98	14.20	14.42	14.64	14.86	15.08	15.30	15.52	15.74	15.96	16.18
22	11.20	11.42	11.64	11.86	12.08	12.30	12.52	12.74	12.96	13.18	13.40	13.62	13.84	14.06	14.28	14.50	14.72	14.94	15.16	15.38
24	10.43	10.65	10.87	11.09	11.31	11.53	11.75	11.97	12.19	12.41	12.63	12.85	13.07	13.29	13.51	13.73	13.95	14.17	14.39	14.61
26	9.68	9.90	10.12	10.34	10.56	10.78	11.00	11.22	11.44	11.66	11.88	12.10	12.32	12.54	12.76	12.98	13.20			
28	8.95	9.17	9.39	9.61	9.83	10.05	10.27	10.49	10.71	10.93	11.15	11.37	11.59	11.81	12.03	12.25	12.47			
30	8.25	8.47	8.69	8.91	9.13	9.35	9.57	9.79	10.01	10.23	10.45	10.67	10.89	11.11	11.33	11.55	11.77			
32	7.58	7.80	8.02	8.24	8.46	8.68	8.90	9.12	9.34	9.56	9.78	10.00	10.22							
34	6.93	7.15	7.37	7.59	7.81	8.03	8.25	8.47	8.69	8.91	9.13	9.35	9.57							
36	6.30	6.52	6.74	6.96	7.18	7.40	7.62	7.84	8.06											
38	5.70	5.92	6.14	6.36	6.58	6.80	7.02	7.24	7.46											
40	5.13	5.35	5.57	5.79	6.01	6.23	6.45	6.67	6.89											
44	4.05	4.27	4.49	4.71	4.93															

1/ Regression equation:

Y = Time in minutes

Y =  $21.1374 + .0044X_1 - .5298X_2 + .0031X_3$

X<sub>1</sub> = Distance in feet

X<sub>2</sub> = Volume of average log in Dec. C - 28 ft. logs

X<sub>3</sub> = (X<sub>2</sub>)<sup>2</sup>

2/ Supplemental time of 24.4% is included in table (included in above equation).

3/ Distance logs actually travel from choker setting point to the landing.

4/ Volume factor of .571 was used to adjust 28 ft. logs to 16 ft. logs.

5/ Times are for production of one tractor. As the cost per minute for the tractor operation is based on two tractors, the cost shown in Illustration 2, Tables 10 and 11.

Activity - Rigging, Yarding and Loading - Western Oregon  
Operations - High Lead Yarding & Hot Deck Skidding  
 Reference for Cost Table Illustration 2, Tables 26, 27, 30, 31, 32, 33, 34, and 39

(4) Operating Time for High-lead Yarding in Western Oregon - Minutes per MBF Gross Volume Yarded 1/ 2/																					
16 Ft. Log 3/ Volume Scrib. Dec.C.	Yarding (Slope) Distance in Feet																				
	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	
10	15.73	16.10	16.46	16.83	17.20	17.57	17.94	18.30	18.67	19.04	19.41	19.77	20.14	20.51	20.88	21.24	21.61	21.98	22.35	22.71	
12	12.11	12.47	12.84	13.21	13.58	13.94	14.31	14.68	15.05	15.41	15.78	16.15	16.52	16.88	17.25	17.62	17.99	18.36	18.72	19.09	
14	9.67	10.04	10.41	10.78	11.14	11.51	11.88	12.25	12.61	12.98	13.35	13.72	14.08	14.45	14.82	15.19	15.55	15.92	16.29	16.66	
16	8.04	8.41	8.77	9.14	9.51	9.88	10.24	10.61	10.98	11.35	11.71	12.08	12.45	12.82	13.19	13.55	13.92	14.28	14.66	15.02	
18	6.94	7.31	7.67	8.04	8.41	8.78	9.15	9.51	9.88	10.25	10.62	10.98	11.35	11.72	12.09	12.45	12.82	13.19	13.56	13.92	
20	6.20	6.57	6.93	7.30	7.67	8.04	8.40	8.77	9.14	9.51	9.87	10.24	10.61	10.98	11.35	11.71	12.08	12.45	12.82	13.18	
22	5.70	6.07	6.43	6.80	7.17	7.54	7.90	8.27	8.64	9.01	9.37	9.74	10.11	10.48	10.84	11.21	11.58	11.95	12.32	12.68	
24	5.36	5.73	6.09	6.46	6.83	7.20	7.57	7.93	8.30	8.67	9.04	9.40	9.77	10.14	10.51	10.87	11.24	11.61	11.98	12.34	
26	5.13	5.50	5.86	6.23	6.60	6.97	7.33	7.70	8.07	8.44	8.80	9.17	9.54	9.91	10.28	10.64	11.01	11.38	11.75	12.11	
28	4.97	5.34	5.71	6.07	6.44	6.81	7.18	7.54	7.91	8.28	8.65	9.01	9.38	9.75	10.12	10.48	10.85	11.22	11.59	11.95	
30	4.86	5.23	5.60	5.96	6.33	6.70	7.07	7.43	7.80	8.17	8.54	8.90	9.27	9.64	10.01	10.37	10.74	11.11	11.48	11.84	
32	4.78	5.15	5.52	5.89	6.25	6.62	6.99	7.36	7.72	8.09	8.46	8.83	9.19	9.56	9.93	10.30	10.66	11.03	11.40	11.77	
34	4.73	5.09	5.46	5.83	6.20	6.57	6.93	7.30	7.67	8.04	8.40	8.77	9.14	9.51	9.87	10.24	10.61	10.98	11.34	11.71	
36	4.69	5.05	5.42	5.79	6.16	6.52	6.89	7.26	7.63	7.99	8.36	8.73	9.10	9.46	9.83	10.20	10.57	10.94	11.30	11.67	
38	4.65	5.02	5.39	5.76	6.13	6.49	6.86	7.23	7.60	7.96	8.33	8.70	9.07	9.43	9.80	10.17	10.54	10.90	11.27	11.64	
40	4.63	5.00	5.37	5.73	6.10	6.47	6.84	7.20	7.57	7.94	8.31	8.67	9.04	9.41	9.78	10.14	10.51	10.88	11.25	11.61	
42	4.61	4.98	5.35	5.71	6.08	6.45	6.82	7.18	7.55	7.92	8.29	8.65	9.02	9.39	9.76	10.12	10.49	10.86	11.23	11.59	
44	4.59	4.96	5.33	5.70	6.06	6.43	6.80	7.17	7.53	7.90	8.27	8.64	9.00	9.37	9.74	10.11	10.47	10.84	11.21	11.58	
46	4.58	4.94	5.31	5.68	6.05	6.42	6.78	7.15	7.52	7.89	8.25	8.62	8.99	9.36	9.72	10.09	10.46	10.83	11.19	11.56	
48	4.56	4.93	5.30	5.67	6.03	6.40	6.77	7.14	7.50	7.87	8.24	8.61	8.97	9.34	9.71	10.08	10.44	10.81	11.18	11.55	
50	4.55	4.92	5.29	5.65	6.02	6.39	6.76	7.12	7.49	7.86	8.23	8.59	8.96	9.33	9.70	10.06	10.43	10.80	11.17	11.53	
52	4.54	4.91	5.27	5.64	6.01	6.38	6.74	7.11	7.48	7.85	8.21	8.58	8.95	9.32	9.68	10.05	10.42	10.79	11.15	11.52	
54	4.53	4.89	5.26	5.63	6.00	6.36	6.73	7.10	7.47	7.83	8.20	8.57	8.94	9.30	9.67	10.04	10.41	10.77	11.14	11.51	
56	4.51	4.88	5.25	5.62	5.98	6.35	6.72	7.09	7.45	7.82	8.19	8.56	8.92	9.29	9.66	10.03	10.40	10.76	11.13	11.50	
58	4.50	4.87	5.24	5.60	5.97	6.34	6.71	7.08	7.44	7.81	8.18	8.55	8.91	9.28	9.65	10.02	10.38	10.75	11.12	11.49	
60	4.49	4.86	5.23	5.59	5.96	6.33	6.70	7.06	7.43	7.80	8.17	8.53	8.90	9.27	9.64	10.00	10.37	10.74	11.11	11.47	
62	4.48	4.85	5.21	5.58	5.95	6.32	6.68	7.05	7.42	7.79	8.16	8.52	8.89	9.26	9.63	9.99	10.36	10.73	11.10	11.46	
64	4.47	4.84	5.20	5.57	5.94	6.31	6.67	7.04	7.41	7.78	8.14	8.51	8.88	9.25	9.61	9.98	10.35	10.72	11.08	11.45	
66	4.46	4.82	5.19	5.56	5.93	6.29	6.66	7.03	7.40	7.76	8.13	8.50	8.87	9.24	9.60	9.97	10.34	10.71	11.07	11.44	
68	4.45	4.81	5.18	5.55	5.92	6.28	6.65	7.02	7.39	7.75	8.12	8.49	8.86	9.22	9.59	9.96	10.33	10.69	11.06	11.43	
70	4.43	4.80	5.17	5.54	5.90	6.27	6.64	7.01	7.37	7.74	8.11	8.48	8.84	9.21	9.58	9.95	10.32	10.68	11.05	11.42	
72	4.42	4.79	5.16	5.53	5.89	6.26	6.63	7.00	7.36	7.73	8.10	8.47	8.83	9.20	9.57	9.94	10.30	10.67	11.04	11.41	
74	4.41	4.78	5.15	5.51	5.88	6.25	6.62	6.98	7.35	7.72	8.09	8.45	8.82	9.19	9.56	9.92	10.29	10.66	11.03	11.40	
76	4.40	4.77	5.13	5.50	5.87	6.24	6.61	6.97	7.34	7.71	8.08	8.44	8.81	9.18	9.55	9.91	10.28	10.65	11.02	11.38	
78	4.39	4.76	5.12	5.49	5.86	6.23	6.59	6.96	7.33	7.70	8.06	8.43	8.80	9.17	9.53	9.90	10.27	10.64	11.01	11.37	



Operating Time for High-lead Yarding in Western Oregon - Minutes per MBF Gross Volume Yarded 1/ 2/ (contd.)

16 Ft. Log 3/ Volume Scrib. Dec.C.	Yarding (Slope) Distance in Feet																			
	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
80	4.38	4.74	5.11	5.48	5.85	6.22	6.58	6.95	7.32	7.69	8.05	8.42	8.79	9.16	9.52	9.89	10.26	10.63	10.99	11.36
82	4.37	4.73	5.10	5.47	5.84	6.20	6.57	6.94	7.31	7.67	8.04	8.41	8.78	9.14	9.51	9.88	10.25	10.61	10.98	11.35
84	4.35	4.72	5.09	5.46	5.82	6.19	6.56	6.93	7.30	7.66	8.03	8.40	8.77	9.13	9.50	9.87	10.24	10.60	10.97	11.34
86	4.34	4.71	5.08	5.45	5.81	6.18	6.55	6.92	7.28	7.65	8.02	8.39	8.75	9.12	9.49	9.86	10.22	10.59	10.96	11.33
88	4.33	4.70	5.07	5.43	5.80	6.17	6.54	6.91	7.27	7.64	8.01	8.38	8.74	9.11	9.48	9.85	10.21	10.58	10.95	11.32
90	4.32	4.69	5.06	5.42	5.79	6.16	6.53	6.89	7.26	7.63	8.00	8.36	8.73	9.10	9.47	9.83	10.20	10.57	10.94	11.30

1/ Regression equation:

Y = Time in minutes

$Y = (3.62719 - .002296X_1 + .005977X_2 + 65.824028X_3) \times 1.23$

X<sub>1</sub> = Scribner Decimal C log volume in woods length logs

X<sub>2</sub> = Yarding distance in feet

X<sub>3</sub> = e<sup>-1</sup> volume per log, where e is the base of natural logarithms and is equal to 2.7182818+.

2/ Delay and supplemental time of 23% is included in table.

3/ Volume factor .5 was used to adjust woods length logs to 16 foot logs.

Range of Conditions on High-lead Study Areas.

- (1) Volume per log - 30 board feet to 6,120 board feet
- (2) Line slope - minus 35% to plus 65%
- (3) Stems per acre - 26 to 74
- (4) Yarding distance - 100 feet to 1,350 feet

Loading Times. The operating times used to develop high-lead loading tables are the same as the operating times for high-lead yarding as the loading production is limited to the production of the yarding operation.



Activity - Reeling, Yarding and Loading - Western Oregon  
Operations - Skyline Yarding  
Reference for Cost Table Illustration 2, Tables 36 and 37

(5) OPERATION TIME FOR STATIC SKYLINE YARDING IN CLEAR CUTS (USING RADIO-CONTROLLED SKYCAR)

MINUTES PER M<sup>3</sup>F GROSS VOLUME YARDED 1/ 2/

YARDING (SLOPE) DISTANCE IN FEET

16 FT. LOG VOLUME SCRIB. DEC.C.	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800
10	9.33	9.47	9.63	9.81	10.02	10.26	10.52	10.80	11.11	11.44	11.80	12.18	12.59	13.02
12	7.26	7.39	7.55	7.74	7.95	8.18	8.44	8.73	9.04	9.37	9.73	10.11	10.52	10.95
14	5.87	6.01	6.17	6.35	6.56	6.79	7.05	7.34	7.65	7.98	8.34	8.72	9.13	9.56
16	4.94	5.07	5.23	5.42	5.63	5.86	6.12	6.41	6.71	7.05	7.41	7.79	8.20	8.63
18	4.31	4.45	4.61	4.79	5.00	5.24	5.50	5.78	6.09	6.42	6.78	7.16	7.57	8.00
20	3.99	4.03	4.19	4.38	4.59	4.82	5.08	5.36	5.67	6.01	6.36	6.75	7.15	7.59
22	3.61	3.75	3.91	4.10	4.31	4.54	4.80	5.08	5.39	5.72	6.08	6.47	6.87	7.30
24	3.43	3.56	3.72	3.91	4.12	4.35	4.61	4.90	5.20	5.54	5.89	6.28	6.68	7.12
26	3.30	3.44	3.60	3.78	3.99	4.23	4.49	4.77	5.08	5.41	5.77	6.15	6.56	6.99
28	3.22	3.35	3.51	3.70	3.91	4.14	4.40	4.68	4.99	5.33	5.68	6.07	6.47	6.91
30		3.29	3.46	3.64	3.85	4.08	4.34	4.63	4.94	5.27	5.63	6.01	6.42	6.85
32		3.26	3.42	3.60	3.81	4.05	4.31	4.59	4.90	5.23	5.59	5.97	6.38	6.81
34		3.23	3.39	3.58	3.79	4.02	4.28	4.56	4.87	5.21	5.56	5.95	6.35	6.79
36		3.21	3.37	3.56	3.77	4.00	4.26	4.55	4.86	5.19	5.55	5.93	6.34	6.77
38		3.20	3.36	3.55	3.76	3.99	4.25	4.54	4.84	5.18	5.54	5.92	6.33	6.76
40			3.36	3.54	3.75	3.99	4.24	4.53	4.84	5.17	5.53	5.91	6.32	6.75
45			3.35	3.53	3.74	3.98	4.23	4.52	4.83	5.16	5.52	5.90	6.31	6.74
50			3.34	3.53	3.74	3.97	4.23	4.51	4.82	5.16	5.51	5.90	6.30	6.74
55			3.34	3.53	3.74	3.97	4.23	4.51	4.82	5.16	5.51	5.90	6.30	6.74
60			3.34	3.53	3.74	3.97	4.23	4.51	4.82	5.15	5.51	5.90	6.30	6.73
65			3.34	3.53	3.74	3.97	4.23	4.51	4.82	5.15	5.51	5.90	6.30	6.73
70			3.34	3.53	3.74	3.97	4.23	4.51	4.82	5.15	5.51	5.90	6.30	6.73
75			3.34	3.53	3.74	3.97	4.23	4.51	4.82	5.15	5.51	5.90	6.30	6.73
80			3.34	3.53	3.74	3.97	4.23	4.51	4.82	5.15	5.51	5.90	6.30	6.73
85			3.34	3.53	3.74	3.97	4.23	4.51	4.82	5.15	5.51	5.90	6.30	6.73

1/ REGRESSION EQUATION:  
YARDING TIME (MIN.) PER M<sup>3</sup>F =  $1.215 \times (2.2513 + 0.00010159 \times \text{SLOPE DIST. SQ.} + 38.235550 \times E)$   
E = THE BASE OF NATURAL LOGARITHMS AND IS EQUAL TO 2.7183.  
V = SCRIB. DEC. C. VOLUME PER 16 FT. LOG.  
2/ DELAY TIME OF 21.5 PER CENT IS INCLUDED IN THE ABOVE TABLE.

(2) OPERATION TIME FOR STATIC SKYLINE YARDING IN CLEAR CUTS (USING RADIO-CONTROLLED SKYCAR)

MINUTES PER 49F GROSS VOLUME YARDED 1 / 2 /														
16 FT. LOG VOLUME SCRIB. DEC.C.	YARDING (SLOPE) DISTANCE IN FEET													
1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000	3100	3200	
10	13.48	13.96	14.47	15.00	15.55	16.13	16.74	17.37	18.02	18.70	19.40	20.13	20.88	21.66
12	11.41	11.99	12.39	12.92	13.48	14.06	14.65	15.29	15.95	16.63	17.33	18.06	18.81	19.59
14	10.02	10.50	11.00	11.53	12.09	12.67	13.27	13.90	14.56	15.24	15.94	16.67	17.42	18.20
16	9.08	9.57	10.07	10.60	11.16	11.74	12.34	12.97	13.63	14.31	15.01	15.74	16.49	17.27
18	8.46	8.94	9.45	9.98	10.53	11.11	11.72	12.35	13.00	13.68	14.39	15.11	15.87	16.64
20	8.04	8.52	9.03	9.56	10.12	10.70	11.30	11.93	12.58	13.26	13.97	14.69	15.45	16.23
22	7.76	8.24	8.75	9.28	9.84	10.42	11.02	11.65	12.30	12.98	13.69	14.41	15.17	15.94
24	7.57	8.05	8.56	9.09	9.65	10.23	10.83	11.46	12.12	12.79	13.50	14.23	14.98	15.76
26	7.45	7.93	8.43	8.97	9.52	10.10	10.71	11.34	11.99	12.67	13.37	14.10	14.85	15.63
28	7.36	7.84	8.35	8.88	9.44	10.02	10.62	11.25	11.91	12.58	13.29	14.02	14.77	15.55
30	7.31	7.79	8.29	8.82	9.38	9.96	10.56	11.19	11.85	12.53	13.23	13.96	14.71	15.49
32	7.27	7.75	8.26	8.79	9.34	9.92	10.53	11.16	11.81	12.49	13.19	13.92	14.67	15.45
34	7.24	7.72	8.23	8.76	9.32	9.90	10.50	11.13	11.79	12.46	13.17	13.90	14.65	15.43
36	7.23	7.71	8.21	8.74	9.30	9.88	10.48	11.11	11.77	12.45	13.15	13.88	14.63	15.41
38	7.21	7.70	8.20	8.73	9.29	9.87	10.47	11.10	11.76	12.44	13.14	13.87	14.62	15.40
40	7.21	7.69	8.19	8.72	9.28	9.86	10.47	11.09	11.75	12.43	13.13	13.86	14.61	15.39
45	7.20	7.68	8.18	8.72	9.27	9.85	10.46	11.08	11.74	12.42	13.12	13.85	14.60	15.38
50	7.19	7.67	8.18	8.71	9.27	9.85	10.45	11.08	11.74	12.41	13.12	13.85	14.60	15.38
55	7.19	7.67	8.18	8.71	9.27	9.85	10.45	11.08	11.73	12.41	13.12	13.84	14.60	15.38
60	7.19	7.67	8.18	8.71	9.27	9.85	10.45	11.08	11.73	12.41	13.12	13.84	14.60	15.37
65	7.19	7.67	8.18	8.71	9.26	9.84	10.45	11.08	11.73	12.41	13.12	13.84	14.60	15.37
70	7.19	7.67	8.18	8.71	9.26	9.84	10.45	11.08	11.73	12.41	13.12	13.84	14.60	15.37
75	7.19	7.67	8.18	8.71	9.26	9.84	10.45	11.08	11.73	12.41	13.12	13.84	14.60	15.37
80	7.19	7.67	8.18	8.71	9.26	9.84	10.45	11.08	11.73	12.41	13.12	13.84	14.60	15.37
85	7.19	7.67	8.18	8.71	9.26	9.84	10.45	11.08	11.73	12.41	13.12	13.84	14.60	15.37

- 1/ REGRESSION EQUATION:  
YARDING TIME (MIN.) PER MBF =  $1.215 \times (2.2513 + 3.00010159 \times \text{SLOPE DIST. SQ.} + 38.235550 \times E)$   
E = THE BASE OF NATURAL LOGARITHMS AND IS EQUAL TO 2.7183.  
V = SCRIB. DEC. C. VOLUME PER 16 FT. LOG.  
2/ DELAY TIME OF 21.5 PER CENT IS INCLUDED IN THE ABOVE TABLE.

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
Cost And Production Studies

Activity - Rigging, Yarding and Loading - Western Oregon

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Operations - Skyline Yarding

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Reference for Cost Table Illustration 2, Tables 36 and 37

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Range of Conditions on Skyline Study Areas

- (a) Volume per log (in terms of 16 foot segments of log lengths actually yarded)- 37 board feet to 1,252 board feet (downhill yarding); 19 board feet to 1,727 board feet (uphill yarding).
- (b) Number of 16 foot logs per log length actually yarded - 0.8 to 6 (downhill yarding); 0.5 to 5 (uphill yarding).
- (c) Skyline slope (on chord) - minus 10% (downhill yarding) to plus 50% (uphill yarding).
- (d) Lateral slope (at right angles to skyline) - minus 90% to plus 100%.
- (e) Yarding distance (along average ground slope) - 100 feet to 2,450 feet.
- (f) Lateral skidding distance - 0 to 250 feet.
- (g) Skyline road widths: average - 150 feet  
maximum - 400 feet



Activity - Rigging, Yarding and Loading - Western & Eastern Oregon  
 Operations - Misc. Small Sale Operation - Yarding by Yarder/Loader  
 Reference for Cost Table Illustration 2, Table 44

(6) Operating Time for Light Yarder-Loader - Minutes per MBF Gross Volume 1/ 2/

16' Log Volume Scrib. Dec. C. 3/	Yarding Distance in Feet									
	50	100	150	200	250	300	350	400	450	500
4	27.27	28.28	29.30	30.31	31.32	32.34	33.35	34.36	35.38	36.39
6	25.89	26.91	27.92	28.93	29.95	30.96	31.97	32.99	34.00	35.01
8	24.54	25.55	26.57	27.58	28.59	29.61	30.62	31.63	32.65	33.66
10	23.22	24.23	25.24	26.26	27.27	28.28	29.30	30.31	31.32	32.34
12	21.92	22.93	23.95	24.96	25.97	26.99	28.00	29.01	30.03	31.04
14	20.65	21.66	22.68	23.69	24.70	25.72	26.73	27.74	28.75	29.77
16	19.40	20.42	21.43	22.44	23.46	24.47	25.48	26.50	27.51	28.52
18	18.19	19.20	20.21	21.23	22.24	23.25	24.27	25.28	26.29	27.31
20	17.00	18.01	19.02	20.04	21.05	22.06	23.08	24.09	25.10	26.12
22	15.83	16.85	17.86	18.87	19.89	20.90	21.91	22.93	23.94	24.95
24	14.70	15.71	16.72	17.74	18.75	19.76	20.78	21.79	22.80	23.81
26	13.59	14.60	15.61	16.63	17.64	18.65	19.66	20.68	21.69	22.70
28	12.50	13.52	14.53	15.54	16.55	17.57	18.58	19.59	20.61	21.62
30	11.45	12.46	13.47	14.48	15.50	16.51	17.52	18.54	19.55	20.56
32	10.41	11.43	12.44	13.45	14.47	15.48	16.49	17.51	18.52	19.53
34	9.41	10.42	11.44	12.45	13.46	14.48	15.49	16.50	17.52	18.53
36	8.43	9.45	10.46	11.47	12.49	13.50	14.51	15.53	16.54	17.55
38	7.48	8.50	9.51	10.52	11.54	12.55	13.56	14.58	15.59	16.60
40	6.56	7.57	8.59	9.60	10.61	11.63	12.64	13.65	14.67	15.68
44	4.80	5.81	6.82	7.84	8.85	9.86	10.87	11.89	12.90	13.91
48	3.14	4.15	5.16	6.18	7.19	8.20	9.22	10.23	11.24	12.26
52		2.60	3.61	4.62	5.64	6.65	7.66	8.68	9.69	10.70
56				3.18	4.19	5.20	6.22	7.23	8.24	9.26
60					2.85	3.87	4.88	5.89	6.91	7.92
64						2.64	3.65	4.66	5.68	6.69
68							2.52	3.54	4.55	5.56

1/ Regression equation:

Y = Time in minutes

Y = (24.7181 + .017217X<sub>1</sub> - .306850X<sub>2</sub> + .000710X<sub>3</sub>) x 1.177

X<sub>1</sub> = Yarding distance in feet

X<sub>2</sub> = Scribner Dec. C log volume in 32 foot logs

X<sub>3</sub> = Scribner Dec. C 32-foot log volume squared

2/ Delay and supplemental time of 17.7% is included in table

3/ Volume factor of .5 was used to adjust 32 ft. logs to 16 ft. logs.



9353.3 - PRODUCTION COSTS  
(Schedule 20)  
Cost And Production Studies

Activity - Rigging, Yarding and Loading - Western Oregon

Operations - Commercial Thinnings - Yarding With Light Crawler Tractor

Reference for Cost Table Illustration 2, Table 46

Operating Time for Light Crawler Tractor Yarding

Development of Time Components

(a) Regression equations (from PNW-41)

i. Outrun time empty:

$$Y = 1.341 + 0.004136D$$

ii. Choker setting time:

$$Y = -1.084 + 2.650N - 0.004775NT_1 + 0.00004951(T_1)^2 \frac{1}{2}$$

iii. Skidding time:

$$Y = 1.220 + 0.007678D \frac{2}{2}$$

iv. Unhooking and decking time:

$$Y = 0.6392 + 0.001421V_2 + 0.0485N^2 \frac{1}{2}$$

Where:

Y = Time per turn of logs in minutes

D = Slope distance in feet

N = Number of logs per turn

T<sub>1</sub> = Number of trees per acre before cut

V<sub>2</sub> = Volume per turn in board feet, Scribner  
(long log scale)

1/ Tractor operator setting and releasing chokers (no extra man).

2/ Equation incorporates possibility that poles over 48 feet in length may be skidded.

v. Summation equation: For BLM commercial thinning sale conditions,  $T_1$  averages 170. In the choker setting time formula,  $0.004775NT_1$ , then becomes a constant of  $0.81175N$ , and  $0.00004951(T_1)^2$  becomes a constant of  $1.43080$ . Combining all equations with these constants, the summation equation for the complete skidding cycle is:

$$Y = 3.5470 + 0.011814D + 1.83825N + 0.0485N^2 + 0.001421V_2$$

Computed Operating Time - Minutes per Turn, Light Crawler Tractor Yarding

Vol. per Turn-Bd.Ft. Scrib.Short Log Scale	Vol. Ave. Log 1/ - Bd. Ft. Scribner		No. of 2/ Logs per Turn	Yarding Distance in Feet 3/									
	Short Log Scale	Long Log Scale		50	100	150	200	250	300	350	400	450	500
200	20	20	10.0	27.65	28.25	28.84	29.43	30.02	30.61	31.20	31.79	32.38	32.97
400	40	40	10.0	27.94	28.53	29.12	29.71	30.30	30.89	31.48	32.07	32.66	33.25
700	70	60	10.0	28.22	28.81	29.40	29.99	30.59	31.18	31.77	32.36	32.95	33.54
1000	100	80	10.0	28.51	29.10	29.69	30.28	30.87	31.46	32.05	32.64	33.23	33.82
1200	120	100	10.0	28.79	29.38	29.97	30.56	31.15	31.74	32.34	32.93	32.52	34.11
1400	140	120	10.0	29.08	29.67	30.26	30.85	31.44	32.03	32.62	33.21	33.80	34.39
1700	170	140	10.0	29.36	29.95	30.54	31.13	31.72	32.31	32.90	33.49	34.09	34.68
1786	190	160	9.4	27.84	28.43	29.02	29.61	30.20	30.79	31.38	31.97	32.57	33.16
1826	220	180	8.3	24.86	25.45	26.04	26.63	27.22	27.81	28.40	28.99	29.58	30.18
1768	250	220	6.8	21.01	21.60	22.19	22.78	23.37	23.96	24.55	25.14	25.73	26.32
1740	300	260	5.8	18.57	19.16	19.76	20.35	20.94	21.53	22.12	22.71	23.30	23.89
1700	340	300	5.0	16.67	17.26	17.85	18.45	19.04	19.63	20.22	20.81	21.40	21.99
1739	370	320	4.7	15.99	16.58	17.17	17.76	18.35	18.94	19.53	20.12	20.71	21.30
1716	390	340	4.4	15.29	15.88	16.47	17.06	17.65	18.24	18.83	19.43	20.02	20.61
1677	430	380	3.9	14.15	14.74	15.33	15.92	16.51	17.10	17.69	18.29	18.88	19.47
1700	500	440	3.4	13.07	13.66	14.26	14.85	15.44	16.03	16.62	17.21	17.80	18.39
1586	610	560	2.6	11.31	11.90	12.50	13.09	13.68	14.27	14.86	15.45	16.04	16.63
1650	660	600	2.5	11.17	11.76	12.35	12.94	13.53	14.12	14.71	15.30	15.89	16.48

1/ 32-foot logs. PNW-41 data are based on scaling in long log lengths by United States Forest Service standards for Douglas-fir subregion. Volumes so determined are adjusted here to approximate Bureau of Land Management short log scale.

2/ Number represents mix of log lengths as yarded, with 32-foot log considered average.

3/ Distance logs actually travel from choker setting point to landing.

Activity - Rigging, Yarding and Loading - Western Oregon  
 Operations - Commercial Thinnings - Yarding with Light Crawler Tractor  
 References for Cost Table Illustration 2, Table 46

Computed Operating Time - Minutes per Turn, Light Crawler Tractor Yarding (Cont'd.)

Vol. per Turn-Bd.Ft. Scrib, Short Log Scale	Vol. Ave. Log 1/ - Bd. Ft. Scribner		No. of 2/ Logs per Turn	Yarding Distance in Feet 3/									
	Short Log Scale	Long Log Scale		550	600	650	700	750	800	850	900	950	1000
200	20	20	10.0	33.56	34.15	34.74	35.33	35.92	36.51	37.11	37.70	38.29	38.88
400	40	40	10.0	33.85	34.44	35.03	35.62	36.21	36.80	37.39	37.98	38.57	39.16
700	70	60	10.0	34.13	34.72	35.31	35.90	36.49	37.08	37.67	38.26	38.86	39.45
1000	100	80	10.0	34.41	35.00	35.60	36.19	36.78	37.37	37.96	38.55	39.14	39.73
1200	120	100	10.0	34.70	35.29	35.88	36.47	37.06	37.65	38.24	38.83	39.42	40.01
1400	140	120	10.0	34.98	35.57	36.16	36.75	37.35	37.94	38.53	39.12	39.71	40.30
1700	170	140	10.0	35.27	35.86	36.45	37.04	37.63	38.22	38.81	39.40	39.99	40.58
1786	190	160	9.4	33.75	34.34	34.93	35.52	36.11	36.70	37.29	37.88	38.47	39.06
1826	220	180	8.3	30.77	31.36	31.95	32.54	33.13	33.72	34.31	34.90	35.49	36.08
1768	260	220	6.8	26.91	27.50	28.09	28.69	29.28	29.87	30.46	31.05	31.64	32.23
1740	300	260	5.8	24.48	25.07	25.66	26.25	26.84	27.43	28.03	28.62	29.21	29.80
1700	340	300	5.0	22.58	23.17	23.76	24.35	24.94	25.53	26.12	26.71	27.31	27.90
1739	370	320	4.7	21.89	22.48	23.07	23.67	24.26	24.85	25.44	26.03	26.62	27.21
1716	390	340	4.4	21.20	21.79	22.38	22.97	23.56	24.15	24.74	25.33	25.92	26.51
1677	430	380	3.9	20.06	20.65	21.24	21.83	22.42	23.01	23.60	24.19	24.78	25.37
1700	500	440	3.4	18.98	19.57	20.16	20.75	21.34	21.93	22.53	23.12	23.71	24.30
1586	610	560	2.6	17.22	17.81	18.40	18.99	19.58	20.17	20.77	21.36	21.95	22.54
1650	660	600	2.5	17.07	17.67	18.26	18.85	19.44	20.03	20.62	21.21	21.80	22.39

1/ 32-foot logs. PNW-41 data are based on scaling in long log lengths by United States Forest Service standards for Douglas-fir subregion. Volumes so determined are adjusted here to approximate Bureau of Land Management short log scale.

2/ Number represents mix of log lengths as yarded, with 32-foot log considered average.

3/ Distance logs actually travel from choker setting point to landing.

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
Cost And Production Studies

Activity - Rigging, Yarding and Loading - Western Oregon

Operations - Commercial Thinnings - Yarding With 4-Wheel Skidder

Reference for Cost Table Illustration 2, Table 47

Operating Time for Rubber-tired Skidder Yarding

Development of Time Components

Regression equations (from PNW-41)

Outrun time empty:

$$Y = 0.8534 + 0.002951D$$

Choker setting time:

$$Y = 1.230 + 0.6952N + 0.002431NT_1$$

Skidding time:

$$Y = 0.04807 + 0.003502D - 0.000001096D^2 + \\ 0.001777V_2 + 0.003079T_2$$

Unhooking and decking time:

$$Y = 1.054 + 0.2627N$$

Where:

Y = Time per turn of logs, in minutes

D = Slope distance in feet

N = Number of logs per turn

T<sub>1</sub> = Number of trees per acre before cut

T<sub>2</sub> = Number of trees per acre after cut

V<sub>2</sub> = Volume per turn in board feet, Scribner  
(long log scale)



## Cost and Production Studies

v. Summation equation: For BLM commercial thinning sale conditions,  $T_1$  averages 170 and  $T_2$  averages 119. In the choker setting time formula,  $0.002431NT_1$  then becomes a constant of 0.41327N. In the skidding time formula,  $0.003079T_2$  then becomes a constant of 0.36640. Combining all equations with these constants, the summation equation for the complete skidding cycle is:

$$Y = 3.55187 + 1.3712N + 0.006453D - 0.000001096D^2 + 0.001777V_2$$

Computed Operating Time - Minutes per Turn, Rubber-tired Skidder Yarding

Vol. per Turn-Bd.Ft. Scrib.Short Log Scale	Vol. Ave. Log 1/ - Bd. Ft. Scribner		No. of 2/ Logs per Turn	Yarding Distance in Feet 3/										
	Short Log Scale	Long Log Scale		50	100	150	200	250	300	350	400	450	500	
200	20	20	10.0	17.94	18.25	18.56	18.87	19.16	19.46	19.74	20.02	20.30	20.57	
400	40	40	10.0	18.29	18.61	18.92	19.22	19.52	19.81	20.10	20.38	20.66	20.93	
700	70	60	10.0	18.65	18.96	19.27	19.58	19.87	20.17	20.45	20.74	21.01	21.28	
870	100	80	8.7	17.04	17.35	17.66	17.96	18.26	18.56	18.84	19.12	19.40	19.67	
840	120	100	7.0	14.71	15.03	15.34	15.64	15.94	16.23	16.52	16.80	17.08	17.35	
812	140	120	5.8	13.06	13.38	13.68	13.99	14.29	14.58	14.87	15.15	15.42	15.69	
850	170	140	5.0	11.97	12.29	12.59	12.90	13.20	13.49	13.78	14.06	14.33	14.60	
817	190	160	4.3	10.99	11.30	11.61	11.92	12.22	12.51	12.79	13.08	13.35	13.62	
836	220	180	3.8	10.30	10.61	10.92	11.22	11.52	11.81	12.10	12.38	12.66	12.93	
806	260	220	3.1	9.33	9.65	9.96	10.26	10.56	10.85	11.14	11.42	11.70	11.97	
780	300	260	2.6	8.64	8.95	9.26	9.56	9.86	10.16	10.44	10.72	11.00	11.27	
782	340	300	2.3	8.25	8.57	8.87	9.18	9.48	9.77	10.06	10.34	10.61	10.88	
777	370	320	2.1	7.95	8.26	8.57	8.87	9.17	9.46	9.75	10.03	10.31	10.58	
780	390	340	2.0	7.82	8.14	8.45	8.75	9.05	9.34	9.63	9.91	10.18	10.45	
774	430	380	1.8	7.56	7.87	8.18	8.48	8.78	9.07	9.36	9.64	9.92	10.19	
750	500	440	1.5	7.10	7.42	7.72	8.03	8.33	8.62	8.91	9.19	9.46	9.73	
732	610	560	1.2	6.71	7.03	7.33	7.64	7.94	8.23	8.52	8.80	9.07	9.34	
726	660	600	1.1	6.55	6.87	7.18	7.48	7.78	8.07	8.36	8.64	8.91	9.18	

1/ 32-foot logs. PNW-41 data are based on scaling in long log lengths by United States Forest Service standards for the Douglas-fir subregion. Volumes so determined are adjusted here to approximate Bureau of Land Management short log scale.

2/ Number represents mix of log lengths as yarded, with 32-foot log considered average.

3/ Distance logs actually travel from choker setting point to landing.

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
Cost and Production StudiesActivity - Rigging, Yarding and Loading - Western Oregon  
Operations - Commercial Thinings - Yarding With 4-wheel Skidder

Reference for Cost Table - Illustration 2, Table 47

Computed Operating Time - Minutes per Turn, Rubber-tired Skidder Yarding (Cont'd.)

Vol. per Turn-Bd.Ft. Scrib.Short Log Scale	Vol. Ave. Log 1/ - Bd. Ft. Scribner		No. of 2/ Logs per Turn	Yarding Distance in Feet 3/									
	Short Log Scale	Long Log Scale		550	600	650	700	750	800	850	900	950	1000
200	20	20	10.0	20.84	21.10	21.35	21.60	21.84	22.08	22.31	22.54	22.76	22.97
400	40	40	10.0	21.19	21.45	21.70	21.95	22.20	22.43	22.66	22.89	23.11	23.33
700	70	60	10.0	21.55	21.81	22.06	22.31	22.55	22.79	23.02	23.25	23.47	23.68
870	100	80	8.7	19.93	20.19	20.45	20.70	20.94	21.18	21.41	21.63	21.86	22.07
840	120	100	7.0	17.61	17.87	18.12	18.37	18.62	18.85	19.08	19.31	19.53	19.75
812	140	120	5.8	15.96	16.22	16.47	16.72	16.96	17.20	17.43	17.66	17.88	18.09
850	170	140	5.0	14.87	15.13	15.38	15.63	15.87	16.11	16.34	16.57	16.79	17.00
817	190	160	4.3	13.89	14.15	14.40	14.65	14.89	15.13	15.36	15.59	15.81	16.02
836	220	180	3.8	13.19	13.45	13.71	13.96	14.20	14.44	14.67	14.89	15.12	15.33
806	260	220	3.1	12.23	12.49	12.74	12.99	13.24	13.47	13.70	13.93	14.15	14.37
780	300	260	2.6	11.53	11.79	12.05	12.30	12.54	12.78	13.01	13.23	13.46	13.67
782	340	300	2.3	11.15	11.41	11.66	11.91	12.15	12.39	12.62	12.85	13.07	13.28
777	370	320	2.1	10.84	11.10	11.36	11.60	11.85	12.08	12.32	12.54	12.76	12.98
780	390	340	2.0	10.72	10.98	11.23	11.48	11.72	11.96	12.19	12.42	12.64	12.86
774	430	380	1.8	10.45	10.71	10.97	11.21	11.46	11.69	11.93	12.15	12.37	12.59
750	500	440	1.5	10.00	10.26	10.51	10.76	11.00	11.24	11.47	11.70	11.92	12.13
732	610	560	1.2	9.61	9.87	10.12	10.37	10.61	10.85	11.08	11.31	11.53	11.74
726	660	600	1.1	9.45	9.71	9.96	10.21	10.45	10.69	10.92	11.15	11.37	11.59

1/ 32-foot logs. PNW-41 data are based on scaling in long log lengths by United States Forest Service standards for the Douglas-fir subregion. Volumes so determined are adjusted here to approximate Bureau of Land Management short log scale.

2/ Number represents mix of log lengths as yarded, with 32-foot log considered average.

3/ Distance logs actually travel from choker setting point to landing.

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
Cost And Production Studies

Activity - Rigging, Yarding and Loading - Western Oregon

Operations - Commercial Thinnings - Loading

Reference for Cost Table Illustration 2, Table 48

Operating Time and Cost for Light Yarder-Loader (Cold Deck Loading)

Minutes per MBF Gross Volume

Vol. Avg. Log Bd. Ft. Scribner 1/ 16' Log    32' Log		No. 32' Logs/MBF	Direct <sup>2/</sup> Loading Time per 32' Log -Minutes	Direct Loading Time Per MBF -Minutes	Fixed <sup>3/</sup> Loading Time Per MBF -Minutes	Total Loading Time Per MBF -Minutes
10	20	50.0	1.494	74.70	3.59	78.29
20	40	25.0	1.494	37.35	3.59	40.94
35	70	14.3	1.494	21.36	3.59	24.95
50	100	10.0	1.494	14.94	3.59	18.53
60	120	8.3	1.494	12.40	3.59	15.99
70	140	7.1	1.494	10.61	3.59	14.20
85	170	5.9	1.494	8.81	3.59	12.40
95	190	5.3	1.494	7.92	3.59	11.51
110	220	4.5	1.494	6.72	3.59	10.31
125	250	4.0	1.494	5.98	3.59	9.57
130	260	3.8	1.494	5.68	3.59	9.27
140	280	3.6	1.494	5.38	3.59	8.97
150	300	3.3	1.494	4.93	3.59	8.52
160	320	3.1	1.494	4.63	3.59	8.22
170	340	2.9	1.494	4.33	3.59	7.92
185	370	2.7	1.494	4.03	3.59	7.62
195	390	2.6	1.494	3.88	3.59	7.47
205	410	2.4	1.494	3.59	3.59	7.18
215	430	2.3	1.494	3.44	3.59	7.03
230	460	2.2	1.494	3.29	3.59	6.88
240	480	2.1	1.494	3.14	3.59	6.73
250	500	2.0	1.494	2.99	3.59	6.58
260	520	1.9	1.494	2.84	3.59	6.43
270	540	1.9	1.494	2.84	3.59	6.43
280	560	1.8	1.494	2.69	3.59	6.28
290	580	1.7	1.494	2.54	3.59	6.13
295	590	1.7	1.494	2.54	3.59	6.13
305	610	1.6	1.494	2.39	3.59	5.98
320	640	1.6	1.494	2.39	3.59	5.98
330	660	1.5	1.494	2.24	3.59	5.83



9353.3 - PRODUCTION COSTS  
(Schedule 20)  
Cost and Production Studies

- 1/ Short log scale  
2/ From PNW-41: Direct loading time/long log = 1.22 minutes;  
loading delay factor = 1.123; adjusted direct  
loading time = 1.494 minutes  
Net log weight (from Chart 5, 9333.34B) 53,000 lbs.  
Scribner Dec. C wt. equivalent per MBF (from BLM Thinning Hand-  
book) - 11,000+ lbs.  
Then:  $53,000 \text{ lbs.} \div 11,001 \text{ lbs./M} = 4.818 \text{ MBF per load}$   
3/ From PNW-41: Fixed time per contractor's load - 17.3 minutes;  
Then:  $17.3 \text{ min.} - 4.818 \text{M} = 3.59 \text{ minutes per MBF}$ , fixed loading  
time (Fixed loading time is for positioning, coupling and  
binding the trailer)



(C3c1) 9353.3 - PRODUCTION COSTS  
(Schedule 20)  
Cost And Production Studies

Activity - Road Construction and Maintenance

Operations - Grubbing

Illustration 4, Table 3

Reference for Cost Table

Source of Data. Grubbing costs are based upon the removal of 428 stumps from 24" to 88" in diameter by a variety of methods, including conventional blasting, splitting with tractor attachment, and under-cutting.

Cost of Materials (used in removal by blasting)

Dynamite (stumping) - 1 1/4 " x 8" @ \$0.213/stick

Caps (electric), with 12' lead @ \$0.530/cap

Total Grubbing Costs 1/ 2/

D.B.H.	Total Cost per Stump	D.B.H.	Total Cost per Stump
20		64	\$43.00
24	\$ 7.90	68	46.85
28	9.90	72	50.75
32	12.00	76	54.60
36	15.80	80	58.55
40	19.70	84	62.35
44	23.55	88	66.30
48	27.45	92	70.20
52	31.30	96	74.05
56	35.20	100	78.00
60	39.15		

1/ Cost rather than time was analyzed by d.b.h. because different methods were used to grub stumps; cost was the only common denominator.

2/ Regression equation:

$$\hat{Y} = \bar{y} + b(X_i - \bar{x})$$

$$= a + bX_i \text{ (where } a = \bar{y} - b\bar{x}\text{), in which}$$

Y = Cost per stump by d.b.h. class

b = Regression coefficient (0.4128)

$X_i$  = Individual stump diameter (each observation)

$\bar{x}$  = Average stump diameter, all stumps

$\bar{y}$  = Average cost per stump, all stumps

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
Cost And Production Studies

Activity - Road Construction and Maintenance

Operations - Excavation

Reference for Cost Table Illustration 4, Tables 4, 5, 6, 7, 8 and 9

Data Source. Production studies included a range of tractor mounted dozers; however, they have been converted to costs based upon the machine rates of the Caterpillar D8K dozer with ripper as the standard machine. Thus, the cost tables are limited to unit costs. Production rates per minute are omitted.

The typical cross section in the recent studies was unbalanced. On the more gentle side slopes, and on side slopes over 60%, the cross section was a full bench or nearly so. Most excavated material was sidecast and drifted no more than 125 feet. There was no significant relationship between percent side slope and cost per yard. No allowance was made for curve widening excavation.

(a) Common Excavation

Tractor Excavation Cost. Eight road construction studies serve as a basis for cost. Time data have been combined with current operation costs.

Total cost - \$22,788.00 ÷ 89,777 cu. yds. = Average cost  
of \$0.254/cu.yd.

Range of typical costs: \$0.23 - \$0.32/cu.yd.

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
Cost and Production Studies

Common Excavation - Cubic yards per station

% Side Slope	14' Subgrade (10' Usable Width)		20' Subgrade (12' Usable Width)	
	Ave. Center Line Cut	Cubic Yards/ Station	Ave. Center Line Cut	Cubic Yards/ Station
0	---	93	---	130
10	1.0	93	1.2	130
20	1.5	147	2.5	309
30	2.0	220	2.5	346
40	2.7	321	3.0	462
50	2.7	370	4.3	617
60	4.3	485	5.0	768
70	5.0	622	7.0	1,088
80	5.7	763	8.0	1,331
90	6.3	907	9.0	1,636
100	7.0	1,133	10.0	2,045

Common Excavation - Cubic Yards per Turnout 1/

% Side Slope	14' Subgrade (10' Usable Width)			20' Subgrade (12' Usable Width)		
	Ave. Ctr. Line Cut	Cu. Yds./ Station	Cu. Yds./ Turnout	Ave. Ctr. Line Cut	Cu. Yds./ Station	Cu. Yds./ Turnout
0	---	37	28	---	51	77
10	1.3	37	28	1.7	51	77
20	2.0	42	32	3.0	69	104
30	2.7	65	49	3.1	79	119
40	3.5	71	53	4.0	138	207
50	4.7	115	86	5.7	142	213
60	8.0	414	311	10.1	706	1,059
70	12.0	898	674	14.0	1,145	1,718
80	13.2	1,097	822	16.0	1,436	2,154
90	14.8	1,376	1,032	18.0	1,770	2,655
100	17.0	1,660	1,245	20.0	2,085	3,128

1/ Turnout yardage is in addition to excavation for the regular road prism.

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
Cost And Production Studies

Activity - Road Construction and Maintenance

Operations - Excavation

Reference for Cost Table Illustration 4, Tables 4, 5, 6, 7, 8 and 9

(b) Rock Excavation

Costs. Costs are based upon five time studies, including a total of 13,928 cubic yards. The material excavated varied from sandstone to basalt. Costs cover the expense of ripping or drilling and shooting and moving loosened material.

Cost per Yard. The cost per yard ranges from \$1.70 to \$6.03. Cost appears to be more closely correlated with the amount of rock excavation than with type of rock. The relationship is inverse; i.e., larger volumes may be excavated at smaller unit costs.

Total cost \$27091 ÷ 13,928 cu. yds. = \$1.95/cu.yd.

Rock Excavation - Cubic Yards per Station

% Side Slope	14' Subgrade (10' Usable Width)		20' Subgrade (12' Usable Width)	
	Ave. Center Line Cut	Cubic Yards/ Station	Ave. Center Line Cut	Cubic Yards Station
0	---	64	---	74
10	1.0	64	0.7	74
20	1.0	86	1.0	119
30	1.5	96	1.5	206
40	2.3	194	2.0	276
50	2.6	263	4.3	509
60	4.2	393	5.0	597
70	4.9	473	7.0	861
80	5.7	569	8.0	990
90	6.2	638	9.0	1,180
100	7.0	735	10.0	1,335



9353.3 - PRODUCTION COSTS  
(Schedule 20)  
Cost and Production Studies

Rock Excavation - Cubic Yards per Turnout

% Side Slope	14' Subgrade (10' Usable Width)			20 Ft. Subgrade (12' Usable Width)		
	Ave. Ctr. Line Cut	Cu. Yds./ Station	Cu. Yds./ Turnout	Ave. Ctr. Line Cut	Cu. Yds./ Station	Cu. Yds./ Turnout
0	---	34	26	---	83	125
10	1.3	34	26	1.0	83	125
20	2.0	70	53	2.5	122	183
30	2.8	134	101	3.1	127	191
40	3.5	95	71	4.0	159	239
50	4.7	141	106	5.6	139	209
60	8.0	340	255	10.1	581	872
70	12.0	678	509	14.0	875	1,313
80	13.8	784	588	16.0	1,067	1,600
90	15.0	936	702	18.0	1,197	1,796
100	17.0	1,107	830	20.0	1,399	2,099

Drift Factors - Allowance for Drift Beyond 100 Feet

Determining Percentage Cost Increase

Factor <u>1/</u>	Average Drift Distance in Feet	Cost Increase in Per Cent <u>2/</u>
7.5	100	0
5.3	150	42
4.2	200	79
3.3	250	127
2.7	300	178
2.4	350	213

1/ From Caterpillar Performance Handbook - bulldozer production, October 1966. Based on distance from mass center of cut to mass center of fill, using 8S blade.

2/ Percentages apply to the tractor cost only; not applicable to drilling expense, blasting expense, or cost of explosives.

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
Cost And Production Studies

Activity - Road Construction and Maintenance  
Operations - Excavation and End Haul With Wheel Scraper

Reference for Cost Table Illustration 4, Table 10

(a) Computation of Cycle Times and Production Rates

Wheel scraper operating at 100% efficiency on 6% effective grade, pay load 16 bank cu. yds.: 1/

Haul Distance (One Way) Feet	Cycle (Round Trip) Time - Minutes	Bank Cu. Yds. Per Hour
500	2.22	433
1,000	2.86	335
1,500	3.48	276
2,000	4.08	236
2,500	4.67	206

Correction for wheel scraper production at 35% efficiency.

Haul Distance (One Way) Feet	Corrected Cycle Time - Minutes	No. of Cycles x 1.8 = Oper. Time Per Hr. Min. Min./Hr.	Tractor Oper. Time Min./Hr.	Corrected Production Bank Cu. Yds. Per Hr.
500	6.34	9.46	17.03	151
1,000	8.17	7.34	13.21	117
1,500	9.94	6.04	10.87	97
2,000	11.66	5.15	9.27	82
2,500	13.34	4.50	8.10	72

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
Cost and Production Studies

(b) Computation of DSK Pusher Corrected Rates

Haul Distance (One Way) Feet	Fixed Cost Per Hour	Operating Time Min./Hr.	\$0.24 x Per Minute	Corrected Operating Cost/Hr.	Corrected Total Machine Rate
500	\$ 17.25	17.03		\$5.65	\$22.90
1,000	17.25	13.21		4.38	21.63
1,500	17.25	10.87		3.60	20.85
2,000	17.25	9.27		3.08	20.33
2,500	17.25	8.10		2.69	19.94

1/ Data from Caterpillar Performance Handbook

(c) Determining Cost per Yard

Hauling Distance (One Way) Feet	HOURLY COST						Hourly Prod'n Cubic Yards
	DSK Pusher Total Machine Cost	Wheel Scraper (Rental Rate) Cost	Total Wages	Subtotal Machine and Wage Cost	10% Gen. & Admin. Cost	Total Hourly Cost	
500	\$22.90	\$41.60	\$28.80	\$93.30	\$9.33	\$102.63	151
1,000	21.63	41.60	28.80	92.03	9.20	101.23	117
1,500	20.85	41.60	28.80	91.25	9.12	100.37	97
2,000	20.33	41.60	28.80	90.73	9.07	99.80	82
2,500	19.94	41.60	28.80	90.34	9.03	99.37	72

## 9353.3 - PRODUCTION COSTS

(Schedule 20)

Cost And Production StudiesActivity - Road Construction and MaintenanceOperations - Shovel Excavation - 3/4 Yard ShovelReference for Cost Table Illustration 4, Table 11Correction for 3/4 Yard Shovel Production at 53% Efficiency

Type of Excavation	Production at 100% Efficiency Cu. Yds./Hour 1/	Correction Factor	Production at 53% Efficiency Cu. Yds./Hour
Easy Digging (Common earth)	135	0.53	72
Rock, Well Blasted	95	0.53	50
Common Excavation			
w/Rock & Roots	80	0.53	42
Rock, Poorly Blasted	50	0.53	27

Determining Cost per Yard

Excavation	Total Hourly Cost	Hourly Production 53% Efficiency = Cu. Yds.	Cost per Cu. Yd.
Easy Digging (Common earth)	\$43.93	72	\$0.610
Rock, Well Blasted	43.93	50	0.879
Common Excavation			
w/Rock & Roots	43.93	42	1.045
Rock, Poorly Blasted	43.93	27	1.627

1/ From Caterpillar Performance Handbook - based upon bank cubic yard measure.



9353.3 - PRODUCTION COSTS  
(Schedule 20)  
Cost And Production Studies

Activity - Road Construction and Maintenance

Operations - Culverts

Reference for Cost Table Illustration 4, Tables 13, 14, 15, 16 & 17

General

(a) Size. Costs for 18" through 96" sizes are for standard riveted pipe. Costs for large structural plate pipe or pipe arches can be computed; for these it is advisable to use manufacturers' prices current at the time of appraisal.

(b) Gage. Gages shown are those normally sold. If different gages will be used, costs must be adjusted accordingly.

(c) Current Delivered Price. These prices are based upon discounted quotations obtained from manufacturers and represent the cost of culvert delivered to the job. Discount for riveted and helically corrugated culvert is 20 percent; discount for large structural plate culvert is 10 percent. These discounts are for substantial orders of 10,000 pounds or more. Prices will be higher for orders smaller than this. Manufacturers' quotations should be used for the smaller orders.

(d) Connecting Bands. Cost is based upon one band for 36 feet of pipe.

(e) Shop Elliptical Forming. This cost is included in the "Installed Cost per Lineal Foot" for all riveted round pipe 36" in diameter and larger.

(f) Installation. Installation costs were originally suggested by manufacturers. The suggested costs have been adjusted upwards to reflect increased machine and labor costs. Installation costs cover erection of structural plate culverts and "lay, line, and join" operations on standard riveted culverts. These costs are included in the "Installed Cost per Lineal Foot."

(g) Beveling. The costs of beveling are based upon the expense of cuts which will give a 2:1 or less straight or step bevel.

Costs are for beveling both ends of the culverts and cover cutting charges only, without regard for material removed in beveling. Thus, culvert costs should be figured for the entire length of uncut material between bevel ends.

9353.3 - PRODUCTION COSTS  
(Schedule 20)  
Cost and Production Studies

(h) Installed Price per Foot. This includes all other costs and represents the normal allowances for culvert installation. When strutting or beveling are required, when gage is different or, more or less structural excavation occurs, the "Installed Cost per Lineal Foot" must be adjusted accordingly.

